

AUGUST 2003

# MODEL Airplane NEWS

## SCALE TOP GUN '03 SHOWDOWN

page 38



## BUILD AND FLY!

Zirol's Backyard Mustang

**New Futaba Radio** Expert features, entry-level price



- > Ryan—Golden Age electric kit
- > Seduction—3D fun flyer
- > Mariner 40—ARF flying boat
- > A-10—hot electric park flyer
- > Ultimate 40—aerobatic biplane

# RCX

THE HOTTEST  
RC SHOW EVER!

page 102

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08



# MODEL Airplane NEWS

AUGUST 2003 VOLUME 132, NUMBER 8

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ON THE COVER: main image—Martin Hendrickson's T-34A Mentor was just one of many spectacular scale aircraft at this year's Top Gun (photo by Gerry Yarrish). Insets (left to right)—Maiorana/Pinegar Tu-4; Joe Rafalowski's F-100; Richard Feroldi's Albatross D5. ON THIS PAGE: aerobatic ace Quique Somenzini wowed the crowd during the Top Gun halftime show (photo by Matt Boyd).



## FIRST ANNUAL

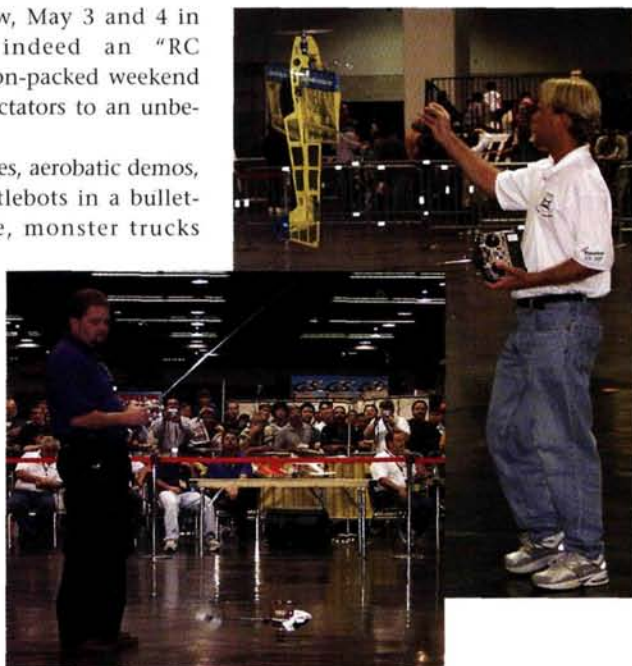


## ... A ROARING SUCCESS!

The first ever RCX show, May 3 and 4 in Anaheim, CA, was indeed an "RC Extravaganza": this action-packed weekend treated thousands of spectators to an unbelievable RC event!

With indoor pylon races, aerobatic demos, 300-pound, dueling Battlebots in a bullet-proof, steel-beam cage, monster trucks hurtling over 10-foot jumps, an indoor race-track and boats spraying rooster-tails in an 80-foot-long "pond," RCX revealed the exciting, energetic side of RC. Manufacturers and vendors showcased their latest products, and most were sold out by the end of the weekend. Didn't make it to Anaheim this year? Don't worry;

you can experience the action on page 102, and then stay tuned—next year's RCX will be even bigger and better, so plan to join us on April 24 and 25 in 2004.



### 15 YEARS OF TOP GUN

For the past 15 years, the scale invitational known as "Top Gun" has attracted the world's most exquisite, museum-scale model planes and expert pilots for a week of competition and camaraderie in southern Florida. The Lakeland Linder airport (home of Sun 'n Fun—the Experimental Aircraft Association's annual meet) is the place for scale enthusiasts to be in late April, and this year, *Model Airplane News* contributor Jerry Smith, senior tech editor Gerry Yarrish and assistant editor Matt Boyd enjoyed some sun and fun of their own; cameras in hand, they captured the action on film. You won't want to miss their 10-page coverage that begins on page 38. For more Top Gun sidebars and photos, see the click trip at [modelairplanenews.com](http://modelairplanenews.com).

That such a high-quality event has grown and maintained its prestige over 15 years is a testament not only to the hard work of Top Gun founder and organizer Frank Tiano but also to the dedicated participants and sponsors. *Model Airplane News* is proud to be a primary sponsor of Top Gun along with Pacer Technology, manufacturer of Zap adhesives, and we look forward to celebrating model craftsmanship and future Top Gun anniversaries.

### SOME OF OUR FAVORITE THINGS

Everyone has them: those tools and gadgets that you can't do without in the shop or at the field. For this issue, we gazed around our offices and saw 25 essentials that we wouldn't trade for anything, and we decided to bare our souls and share this great stuff with you. Turn to page 28 for a sneak peek into what the editors of *Model Airplane News* couldn't live without. Got another cool tool or gadget that we didn't list? Send us an email at [man@airage.com](mailto:man@airage.com), and let us know what your must-haves are!

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## RADIAL ENGINE MAGIC

I really learned a lot about radial engines from your July 2003 article, "The Magic of Radial Engines." The timing couldn't have been better for me, as I'm about to install a Saito FA-170R3 in a Balsa USA Fokker D-VIII that I'm currently building. The article contained a lot of useful information that provided insight into these beautiful works of art. I especially liked the write-up about a radial engine's crankshaft and connecting rods. But I have one question: can you explain why a radial engine has an odd number of cylinders? Thanks! [email]

ROGER LABBE

Roger, I'm glad that you found the radial engine article valuable; good luck with your Fokker. To answer your question, let's look at a 7-cylinder engine. As you know, each cylinder has 4



strokes: intake, compression, power and exhaust; and two revolutions of the crankshaft are required to complete the cycle. Thus, it takes two revolutions for all of the cylinders to fire once. The firing order is 1-3-5-7-2-4-6. Notice that the next cylinder to fire is always two away from the cylinder that just fired. This keeps

everything in balance. For each piston that's firing at top dead center (TDC), the adjacent cylinders are just short of TDC at the end of their exhaust stroke. This allows the firing cylinders to orbit the engine twice with each crankshaft revolution, producing power pulses that are evenly spaced. If you substitute an even number of cylinders, the transition from the first revolution to the second wouldn't be equally spaced. After all of the odd-numbered cylinders had fired, it would be a three-step—not a two-step—jump to fire the first even-numbered cylinder. At the end of the firing of the even-numbered cylinders, it would be a one-step jump back to the odd-numbered cylinders, and this would create an interruption of the power pulses. I hope this information helps you understand these complex pieces of machinery. RB

**Insert fill nozzle.  
Fill nozzle controls  
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## TO SHIM OR NOT TO SHIM

I always enjoy Dave Gierke's "RPM" column in *Model Airplane News*. I recently purchased a Webra 75-P5 engine and plan to install it in one of my helicopters, primarily so I can use fuel with a lower nitro content. I removed the head and found that there was no head gasket; however, the Webra parts list indicates there is a "distance shim." Do I need the distance shim to run low-nitro fuel, and if not, do I need a head gasket? [email]

PAUL PHILLIPS

Paul, many modern engines come from the factory without a head gasket; modern machining techniques produce almost perfectly matched parts that don't require a gasket to provide a gas-tight seal between them. I suggest that you run the engine without the distance shim (head shim) to see how it works with your low-nitro fuel. If the engine doesn't detonate (you'll hear a sound like an egg being fried) and over-heat, its compression ratio is probably OK. The head shim is primarily used to lower the compression ratio when high-nitro fuel blends are incorporated.

Dave Gierke

## TISSUE COVERING

I have a Guillows Cessna 150, and the guy at the hobby shop sold me some clear dope for the tissue. He told me to first brush it on all the surfaces to be covered and then attach the tissue with another coat of dope. He said that the tissue should be dampened after it has been attached, and another coat of dope should be applied all over the covering to shrink it. When I tried this on the wing, I let the tissue dry, but it didn't stick to the doped surface of the wing. The dope just soaked into the wood and, within a few seconds, there was nothing left to bond the tissue to the wood! I kept applying dope, but it never lasted long enough to use as an adhesive. What am I doing wrong, and what should I try? [email]

"JOE MODELER"

You may need to coat the structure and let it dry several times before it's sealed, and you can apply the tissue. An easier method is to apply the tissue with a little white glue thinned with water, let it dry and then shrink it with a misting of rubbing alcohol. Seal the finished model with two light coats of clear lacquer, and you're ready to go fly! All of these tips and more are included in Dave Robelen's "Covering Small Models with Tissue" in the how-to section at [modelairplanenews.com](http://modelairplanenews.com); check it out!

DC

## IN-FLIGHT FIXES

I'm sure you have received lots of letters regarding the inconsistencies on page 34 of the June issue ("In-Flight Fixes" sidebar in the "Aerobatic ARFs—Editors' Top 10 Picks"

article). The description in the blue box, "Test-Dive to Check CG," is correct; the sidebar text is wrong. Intuitively, it seems backward that the airplane's nose will rise if the CG is too far forward (nose-heavy), but that is the correct interpretation. The forward CG has made the airplane too stable, and it is aggressively attempting to return to its level-flight trim condition after the elevator has returned to neutral. Conversely, if the CG is too far aft (tail-heavy), the dive will steepen, since the airplane is unstable and is trying to

move away from its level-flight trim point.

ROBERT G. HOEY  
Palmdale, CA

Robert, as you state, the illustration in the blue box is correct, and the main text has a typo. When the CG is too far forward, the model is nose-heavy; when the CG is too far aft, the model is tail-heavy. We appreciate your clarification and apologize for any confusion the inconsistency in the sidebar text may have caused.

GY +

# Under Cover.

## Head Lock (tm) Remote

spring loaded locking Glow Plug Connector fits under Plane cowls and Helicopter canopies, letting you cover the glow plug and head. #M021 Single shown.

## Remote Jack

allows you to power your plug(s) from anywhere on the model, away from the prop



## Extended version

For deep heat sink heads on cars, helicopters and boats. (#M056)



**Head Lock.  
Head Lock Remote.  
The Original Locking  
Glow Plug Connectors.**

Or for direct power: **Head Lock (tm)** fits all standard glow plugs, is powered by 1.2V to 1.5V battery or Power Panel. (#M009 Shown)



Want to cover your engine? Or keep your hands away from the prop? Use a **Head Lock Remote**. They look great, they work great and they're backed by **Sullivan** quality.

**Head Lock Remotes** are available in single (M021), Extended (M056) and twin (M022) configurations. They have a low profile locking head and a remote jack that can be hidden away from the engine. **Head Locks** feature 18 gauge power cords and are available in Standard (M009) and Professional (stainless steel, M037).

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# plug prey

## FLY TO FIGHT, FIGHT TO WIN

As soon as you launch your Firebird Commander™, bandits are all over your six. You jink right before they can get a shot off and claw for altitude. Coming out of the turn, you find yourself right on the tail of one of your Fighterbird™ buddies. Fortunately you see him before he sees you, and you blast him with your Sonic Combat Module. A shrill tone comes from his stricken Bird as its motor quits. Sensing victory, you spiral down behind him, blasting away and forcing him to land. A grin spreads across your face, "Splash one."

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## **Z1** Firebird Commander

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Throttle: proportional  
SCM included

## [OPTIONAL ACCESSORIES]



### **Sonic Combat Module (SCM)**

The Sonic Combat Module emits a sonic "blast" with an effective range of up to 80 feet. To score a hit, get within 80 feet of another SCM-equipped HobbyZone plane, lock onto their tail and fire. When hit, the victim's Sonic Combat Module will emit a high-pitched tone and disable their motor for 10 seconds. During this time, they will still have directional control so they can maneuver into position for a counter-attack or make a safe landing. HBZ4020



### **Aerial Drop Module (ADM)**

Challenge friends to target practice or see who can get the longest parachute hang-time with the Aerial Drop Module. The ADM uses an innovative electro-magnetic release mechanism that allows X-Port-equipped HobbyZone airplanes to drop a streamer bomb or parachute jumper, which are included. HBZ6023



### **Stealth target**

The sleek Stealth fighter ground target is a great way to practice for the next big sortie or take on friends in a target shooting contest. It comes equipped with a sensor that registers hits from the Sonic Combat Module with a high-pitched tone. HBZ4025



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# AIR SCOOP

by the Model Airplane News crew

## NORTHEAST SAILPLANE PRODUCTS

# JAVELIN 2 AND TRICK 1000



Fly in style this summer with these two new backyard aerobats from Northeast Sailplane. The Javelin 2 is a new and improved version of the already popular Javelin. Modifications include: the replacement of the tube airframe with a fuselage; a new tail shape; a strong fuselage that supports larger brushless motors; and longer landing gear to accommodate larger props. Constructed of CNC-machined balsa and ply and covered with Solarfilm, the 40-inch-wingspan Javelin 2 is fully aerobatic. It requires a 4-channel radio with 4 servos and a 7- to 10-cell brushless motor, and it sells for \$149.95.

Of course, high-flying aerobats come in every size, shape, color and material, and the brand-new Trick 1000 proves that EPP foam and Coroplast can be just as exciting and maneuverable as balsa and plastic film. They're also virtually indestructible, and that comes in handy when you're learning aerobatics. Designed for use with brushless motors, the 39.5-inch-wingspan Trick 1000 comes almost ready to fly and includes a fiberglass motor mount, a complete set of hardware and a plastic canopy. Price: \$129.95.

Northeast Sailplane Products (802) 655-7700; nesail.com.

## ELECTRIFLY AC & DC Chargers



Great Planes has introduced two new peak chargers for backyard electrics: the Electrify AC Park Flyer and the Electrify Peak 400 DC. The AC is an affordable wall charger for home use. It charges 1 to 8 Ni-Cd or NiMH cells at a current that's adjustable from 200 to 800mA. It uses the standard JST-type 2-pin connector found on many park flyers and can be plugged into any standard 110V household outlet.

The Peak 400 DC is designed for field use and can handle 1 to 10 cells at one of three current settings: 0.5 amp, 1.2 and 2.5 amps. It also has three corresponding trickle-charge rates of 40, 60 and 100mA. It's light and compact, and it features standard Tamiya connectors. The chargers each cost \$33.99.

Electrify; distributed by Great Planes Model Distributors (800) 637-7660; electrify.com.



## ICARE Schulze Future Universal Brushless ESCs

Because the electronic speed control (ESC) in a brushless-motor system handles motor current, timing and all other functions electronically, much of the power-robbing friction and weight of a conventional setup is eliminated. Another key benefit of electronic control is programming, and this is where the new Future Universal ESCs from Schulze represent a great leap forward. These microprocessor-driven ESCs can easily be configured by the user to suit any brushless-motor application. They can be set for conventional RC aircraft, motor gliders, helicopters, or RC cars and boats, using a set of mini switches that also permit adjustments for motor brake, gear- or belt-drives, soft or hard motor timing and three switching frequencies. To allow users to exploit this amazing versatility, the ESCs come equipped with plug-in connections and matching cables, so you can quickly install and remove them without soldering—very cool! They're available for 6 to 32 cells to suit a wide range of applications. Check out ICARE's website for prices.

ICARE Sailplanes and Electrics (450) 449-9094; icare-rc.com.





EAGLE TREE SYSTEMS

## USB FLIGHT DATA RECORDER

For most of us, the only clues we have about what our models are doing in the air is what we can see and hear from the ground, and that doesn't come close to telling the whole story. But with Eagle Tree Systems' USB Flight Data Recorder, you can keep track of all of your model's essential functions and download the info to your PC or laptop for later analysis using the included software. This unit records servo positions, airspeed, altitude and battery status at every point during your flight, and it plays them back graphically in real time. It uses your computer's universal serial bus (USB) port, so there are no drivers to install, and you can plug and play without rebooting. The unit weighs less than 1 ounce and will retain flight data even when it's disconnected from its battery. If you want to know the full story on all of your flights, pick up one of these.

**Eagle Tree Systems** (425) 614-0450;  
eagletreesystems.com.

## FIRST PLACE ENGINES 1.3ci Gas Engine

There's no denying that gas engines are the way to go for economy and power, but many models are considered too small to accommodate a gas engine. The answer, of course, is the new 1.3ci from First Place Engines; it's the perfect replacement for that old .90 to 1.20 2- or 4-stroke, and it features all the reliability and affordability that modelers have come to expect from First Place Engines. Best of all, it sells for less than \$400. Specifications: weight—40 oz.; thrust—10 lb.; rpm range—2,000 to 7,400; horsepower—1.7hp at 1,700rpm; recommended prop—16x8.

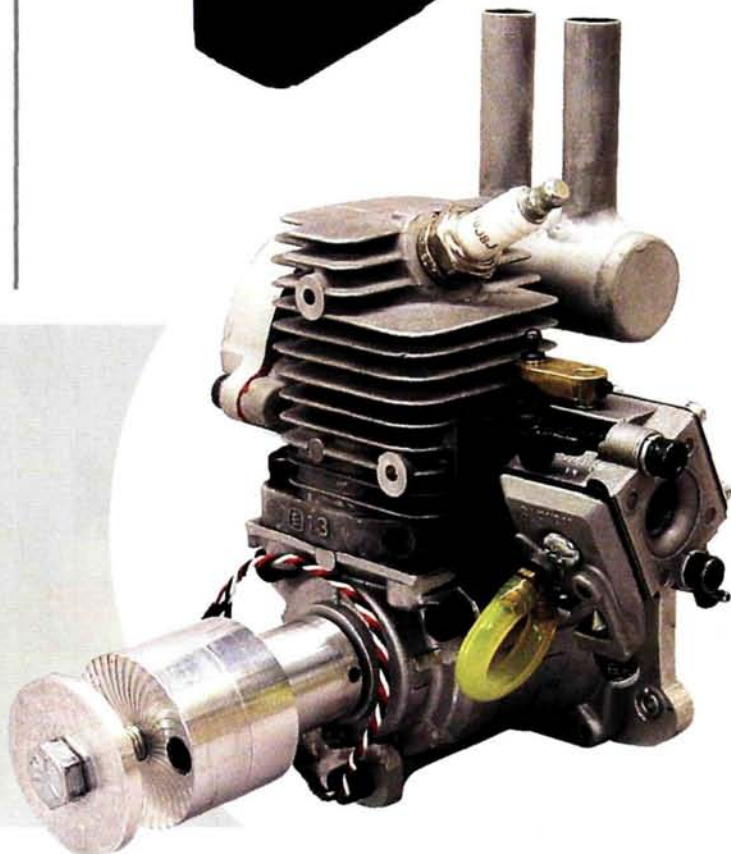
**First Place Engines**; distributed by Sig Mfg. (641) 623-5154;  
sigmfg.com.

FUTABA

## NEW SERVOS FOR ANY OCCASION!

Futaba has released 4 new servos to cover the entire range of RC applications. The S3107 Micro 9G servo measures just 20x10x20mm and weighs just 0.32 ounce. Its transit time for 60 degrees is just 0.12 second, and it produces 16.7 oz.-in. of torque, so it's ideal for small park flyers. The S9650 Digital Mini servo weighs 1 ounce with a transit time of 0.09 second per 60 degrees with 49 oz.-in. of torque. The S3010 standard servo weighs 1.4 ounces, moves 60 degrees in 0.16 second and produces 90 oz.-in. of torque. The heavy-duty, standard-size S3305 weighs 1.6 ounces, has a 0.2 second/60-degree transit time and cranks out a whopping 124 oz.-in.! Prices: \$26.99 (S3107), \$84.99 (S9650), \$31.99 (S3010), \$44.99 (S3305).

**Futaba Corp. of America**; distributed by Great Planes Model Distributors Co. (800) 637-7660; futaba-rc.com.







HOBBY HANGAR

## DAVE PLATT HEATWAVE

If you're like most modelers, the recent "explosion" in the turbine-powered jet market has caught your attention. If you're ready to join the jet set, check out the new Heatwave from Hobby Hangar. Designed by Dave Platt, the 84-inch-wingspan Heatwave features all-wood, easy-to-build construction, laser- and CNC-cut balsa and ply parts, plug-in wing panels, a full set of plans and a photo-illustrated instruction manual. It's designed to be powered by an 18- to 20-pound-thrust turbine and sells for \$459.99.

Hobby Hangar (321) 727-8227; hobbyhangar.com.

BRISON R/C ENGINES

## Revolution 52cc Engine

The new Revolution 52cc gas engine comes to us from one of the most trusted names in giant-scale RC power. For years, modelers have counted on Brison to fill all their giant-scale needs, and the new Revolution 52cc shows the top quality and maximum power that have earned Brison engines such a stellar reputation. The Revolution features automatic ignition, reed induction, rear intake, rear exhaust and a rear spark plug. Specifications: bore—43.28mm; stroke—35.5mm; horsepower—5hp at 8,000rpm; rpm range—2,000 to 8,500; weight—3 lb.; recommended prop—22x10; price—between \$499 and \$550.

Brison R/C Engines (972) 241-9152; brisonrcengines.com.



It certainly wouldn't be difficult to imagine yourself as a world-class competitor as you fly Thunder Tiger's new Imagine 50. Designed by Tsugutaka Yoshioka, this distinctive, light ARF is very nimble and responsive. Covered in Ultracote, the 54-inch-wingspan model sports a fiberglass cowl and wheel pants. It should be powered by a .45 to .61 2-stroke or .52 to .72 4-stroke engine.

**Thunder Tiger;** distributed by Ace Hobby Distributors (949) 833-0088; acehobby.com.

The folks at 3 Sea Bees Models are well known for producing some of the most authentic scale models around, and their new Fokker D-VII is certainly no exception. Available in standard red

3 SEA BEES MODELS

## FOKKER D-VII

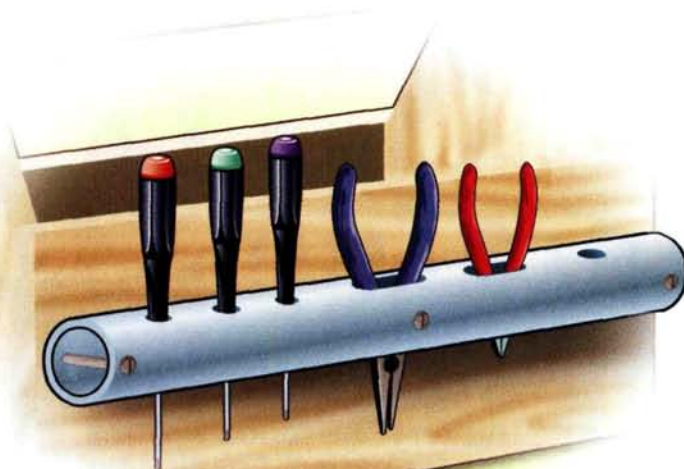


and white and a special lozenge color scheme, the 66.9-inch-wingspan Fokker D-VII comes almost ready to fly and requires a .60 to .90 2-stroke or a .80 to 1.20 4-stroke engine. Of course, the Fokker D-VII features all the special scale details that define a vintage model. For scale enthusiasts who demand the very best, however, the D-VII—like all of 3 Sea Bees' models—is also available in a "museum-quality" version that re-creates the full-size plane down to the last detail. Prices: \$899 (red and white), \$999 (lozenge scheme), \$1,899 (museum-quality red and white scheme), \$1,999 (museum-quality lozenge).

3 Sea Bees Models Inc. (425) 334-6089; 3seabees.com. ✦



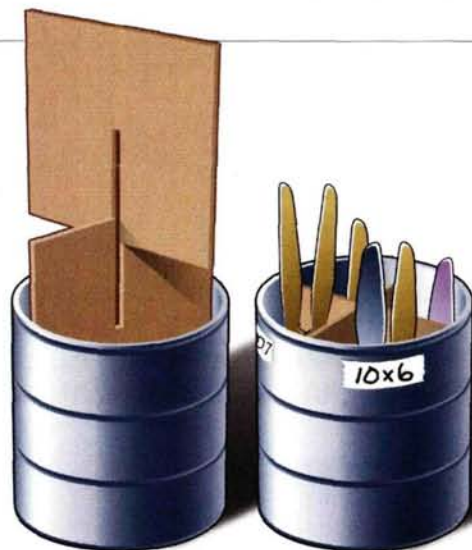
**SEND IN YOUR IDEAS.** *Model Airplane News* will give a free, one-year subscription (or a one-year renewal, if you already subscribe) for each idea used in "Tips & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can neither acknowledge each one nor return unused material.



## TOOL TIME

Modelers tend to cram a lot of tools into their field boxes so that any emergency they may encounter at the flying field will be covered. But this usually means that the tools aren't very well organized, and it's difficult to find what you need. Here's a simple way to end the chaos. At your local hardware store, purchase a length of 2-inch-diameter, thin-wall PVC pipe. Cut it to match the width of your field box, bore holes of various sizes in it, and mount the pipe on the back of your field box. You now have an organized, handy place to "hang" your tools.

*Fred Williams, Jacksonville, FL*



## PROP-ER STORAGE

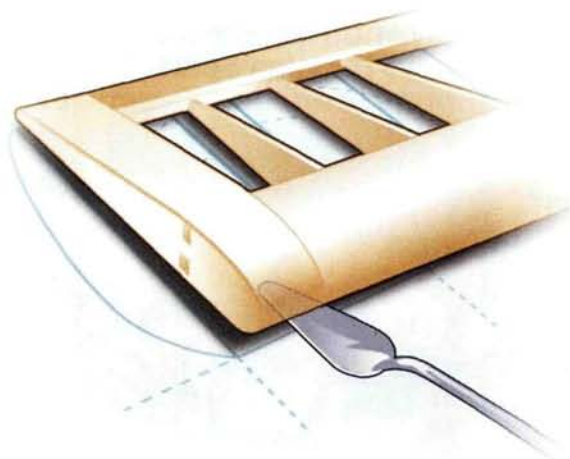
Over time, most modelers end up with a collection of propellers that usually end up in stored in a box. To retrieve one, you have to rummage through the box. Here's a clever idea: use an empty coffee can for propeller storage. Make two interlocking dividers out of cardboard (or another similar material), and place them in the can at a 90-degree angle to each other. Add subdividers to make as many compartments as you need, and then label the outside of the can with each prop compartment's contents (diameter and pitch). It's now easy to identify—and grab—the prop you want when you need it.

*Jack Goodrich, Sterling Heights, MI*

## GOING SEPARATE WAYS

Has this ever happened to you? You're working on your latest model and have covered the plan with a sheet of wax paper to prevent the glue from sticking to it. But CA sometimes sticks to the wax paper, and this makes it difficult to remove the parts from it. To quickly and easily separate balsa from wax paper, use a curved-blade artist's palette knife. Palette knives are made of thin, high-quality metal and can be carefully slid between the balsa and the wax paper to separate the two. These knives are available in art stores, are inexpensive and come in a wide range of shapes and sizes.

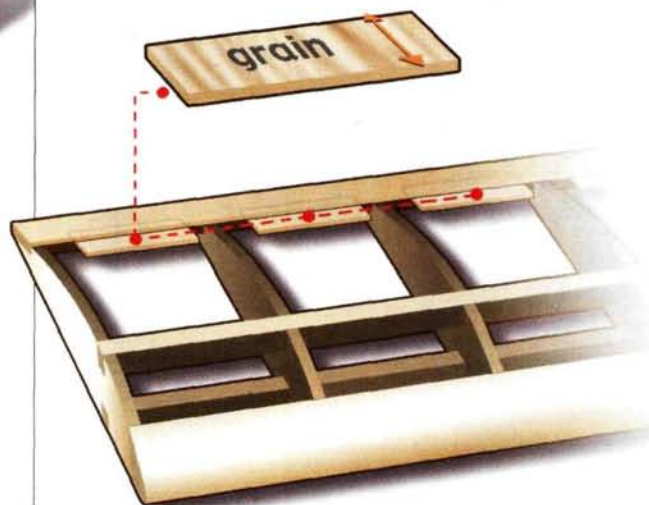
*Gary Ritchie, Olympia, WA*



## SEAMLESS SHEETING

On some built-up wings that are fully sheeted, have you ever noticed that the balsa sheeting sags between the ribs or that the seams don't match up? By simply placing a piece of balsa on the underside of the sheeting between the ribs, you add additional support for the sheeting and a lip that perfectly aligns the seams of the sheeting.

*Avey Shaw, Huntington Station, NY*





**SEND IN YOUR SNAPSHOTS.** *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable but please do not send digital printouts. We receive so many photographs that we are unable to return them. All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in! Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



## **William Clary, Lake Havasu City, AZ PROCOMPOSITES GILES G-202**

As you can see, William is very proud of his ProComposites Giles G-202. The competition thoroughbred weighs about 10 pounds, spans 76 inches and is powered by a YS 140L with a Don Harris smoke system. The model has a composite/epoxy fuselage and sheeted-foam wing and tail surfaces. Chad Johnson Custom Paint applied the vibrant color scheme. William tells us that the Giles is one of the best airplanes he has flown over the past several years. We think his smile says it all!



## **Marty Cane West End, NC SOUTHERN EAGLE**

Here's something a little different that Marty scratch-built. He powers his Southern Eagle with an O.S. .91 4-stroke that swings a 13x6 APC prop. He covered the low-wing aerobat with Top Flite MonoKote and uses a Futaba 6XA radio for guidance. Marty is pretty happy with his Eagle and says it's a joy to fly and has no bad habits.



## **Lucien Desmarais St. Charles-Borromée, Quebec, Canada FAIRCHILD F-27**

Now here's a model you don't see every day at the flying field! Lucien built this stunning model in 1979 from an Exhibit Air kit. This beautiful civil transport boasts operating flaps, spans 98 inches and runs on two O.S. .61 2-stroke engines. Lucien has entered the plane in several contests, and each time, it has won Best of Show. After looking at the photo, we can see why!

## **Richard Baylis, Westmount, Quebec, Canada MICK REEVES HAWKER HURRICANE**

Richard built this fabulous-looking 1/6-scale Hurricane from a Mick Reeves kit. Spanning 80 inches and weighing 13 pounds, it's powered by a GMS 1.20 engine. The Hurricane sports Unitracts Intl. retracts made especially for this model. The fighter is covered with Nelson Litefab and painted with Nelson paints. Richard says the topside color scheme and the black and white underside are early "Battle of Britain," according to his research. This veteran sure is a beauty!



## **Rob VanDeMoesdyk, London, Ontario, Canada TOP FLITE P-47**

How do you duplicate an all-metal warbird? In Rob's case, he used recycled aluminum soda and beer cans. He claims that the metal weighs only about 10 percent more than most plastic coverings, and it's very resistant to hangar rash. The sharp-looking Jug features flaps, retractable main and tail gear and a bomb drop. Other features include scale hinging, a sliding canopy, homebuilt landing gear with working oleo struts and a custom, scale exhaust that exits at the rear of the cowl. Rob loves the way his warbird flies and, in his own words, "... has bombed the heck out of" his airfield.





**John Twiss**  
Danvers, MA

## NORTHEAST AERODYNAMICS SPORT-AIR 60

John recently built this enlarged version of Northeast Aerodynamics' popular Sport-Air 40. According to John, with its 67-inch wingspan and semisymmetrical airfoil, the plane has a very wide performance envelope. An O.S. .60 FP that runs on 10 percent Omega fuel and turns an APC 12x6 prop powers the model. John covered the model with MonoKote and says the model reminds him of the old VK Cherokee.

**John Curran**  
Northridge, CA  
**GEE BEE Y**

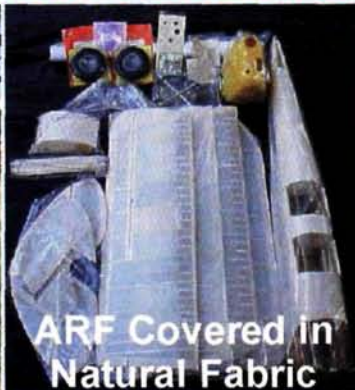
Built from an Ikon N'west kit, this sharp-looking Gee Bee spans 90 inches and weighs 24 pounds. The model is covered with Stits Lite fabric, and John used Stits paints for a realistic finish. A 3.2 Sachs J&A engine provides power, and John uses a Futaba 8AUPS radio to fly the classic plane. ✈



# LARGE SCALE ARFS AND KITS

## INCLUDES CONTEST GRADE DETAILS

### 1/4 Scale Tiger Moth



ARF Covered in  
Natural Fabric

### Summer Sale

1/4 Tiger Moth ARF \$500

1/4 Tiger Moth Kit \$345

Cockpit Details, Pneumatic Wheels  
Wires and Turnbuckles, Fiberglass Cowling  
Fabric Covered (ARF only)



Includes Cockpit Details



### 1/4 Fokker D7



Optional Iron On Camo Covering

### Summer Sale

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Cockpit Details, Wire Wheels  
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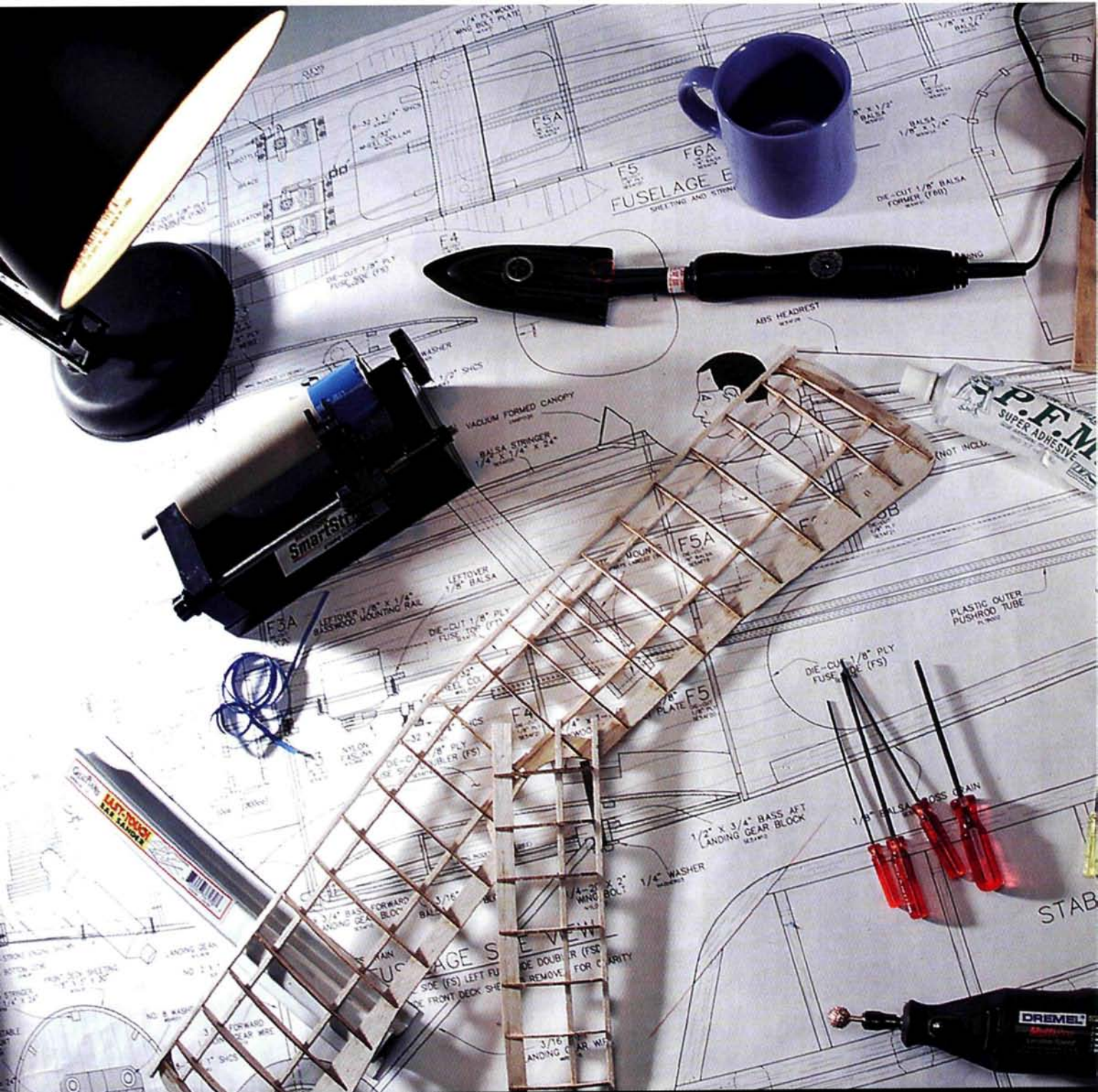
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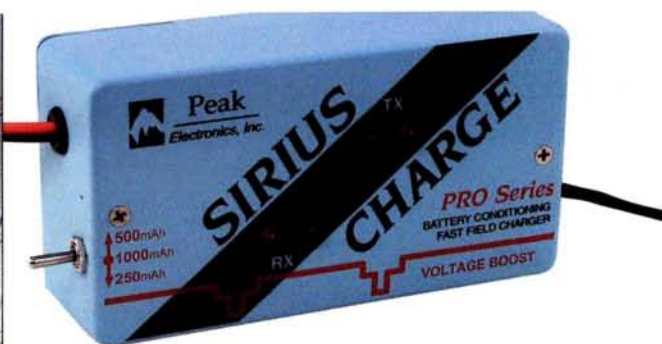
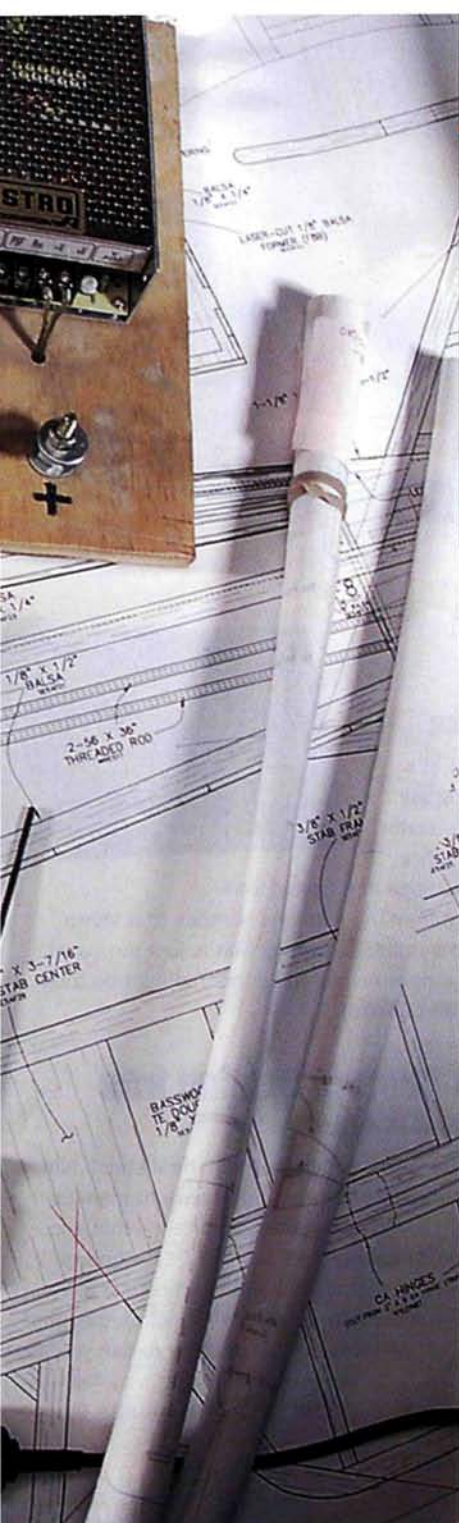




# Editors' Picks

## 25 goodies, gadgets





## Sirius Charger ▲ Don't leave home without it

A low battery can really ruin your day. Since we started using the Sirius Charge Pro, though, we haven't had a single battery failure. This automatic charger is simple to use; just hook it up to a 12V power source, connect your battery to the charger, and the charger does the rest. Since we're on the go a lot, the ability to charge flight packs on the way to the field is a big plus. **Price—\$129.95.**



## Great Planes Slot Machine ▲ Motorized hinge slotting

Cutting hinge slots is a chore that always took an entire evening's work to accomplish. You had to sit there and slice away with a hobby knife for hours, just to make slots that probably needed to be adjusted when it was time to install the hinges. Since we started using the Great Planes Slot Machine, our slot-cutting time has been reduced to just a few minutes for an entire plane. Now, we just mark the hinge location on the control surfaces, hold the Slot Machine's motorized blades against the wood, switch the unit on and, in a couple of seconds, our slots have been cut cleanly, and the hinges fit perfectly with little (if any) adjustment. **Price—\$34.99 (w/cord); \$54.99 (cordless).**

## Hangar 9 Fieldmate & Power Panel ▲ Flightline buddies

We spend a lot of time building and writing about airplanes, and those tasks don't always allow us to accomplish other things, such as building a flight box. We needed one that wasn't too large and bulky yet was sturdy and big enough to hold the essentials needed on the flightline. We've used the Hangar 9 Fieldmate prebuilt flight box for more than a year now, and it has really fulfilled our needs nicely. It has room for an electric starter, screwdrivers and other commonly used tools. The box is factory-painted and has held up well during many outings; in fact, it looks as good as new! Combine the Fieldmate with Hangar 9's Deluxe Power Panel, and you'll have a great flightline duo. The power panel has reliably supplied power to our starter, glow igniter and other electrical accessories. We really like the built-in meter that shows how many amps the glow plug needs to light. **Price—\$39.95 (Fieldmate); \$22.95 (Deluxe Power Panel).**

by the *Model Airplane News* crew

**T**he opportunity to exchange ideas and building techniques with fellow modelers is one of the things we enjoy most about our hobby. Each day at the office, we receive email, letters and phone calls from modelers who have a question or two on a variety of subjects. The topics range far and wide, but the most commonly asked question is: which support equipment and building tools are most used by the *Model Airplane News* editors? We thought it would be fun to give you an inside look at our offices so you can see what we really do use to build, fix and fly our models. We dug around and came up with 25 tools and accessories that we all use practically every day. We were very surprised at the wide range of stuff on our worktables. Take a look; you'll be surprised, too!

# and gizmos we use every day



## Top Flite Smart Stripe

It's not only smart, but it's easy, too!

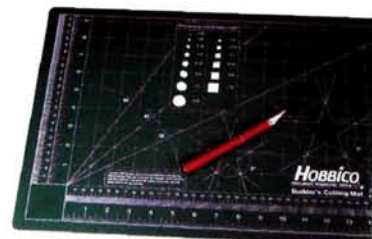
It's no secret around here that we like to cover our models with plastic heat-shrink covering. It goes on easily, and if repairs are needed, they can be accomplished quickly. The nice thing about plastic covering is that it can be cut to suit a great variety of trim schemes, and that's where Top Flite's Smart Stripe cutter comes into the picture. Before we begin covering our next project, we cut off 4 or 5 inches from the end of a roll to use on the cutter—no problems with color-matching here. The cutting machine uses no. 11 hobby blades for accurate cuts, and we can make precise strips that range from  $\frac{1}{16}$  inch to several inches wide that are long enough to suit any model we build. **Price—\$21.99.**



## Hobbico Builder's Cutting Mat

Preserve your work surface

If you build your models from kits, it's inevitable that the required cutting will score your work surface. Because some of us do our building here at the office, the worktables we use aren't like those in a typical workshop, so we need to protect them from the cuts and scrapes that sharp hobby blades can inflict. Hobbico's Builder's Cutting Mat is just the ticket. The mats come in three sizes and have helpful rulers printed right on them. **Prices—\$7.99 (12x18) to \$21.99 (24x26).**



## Great Planes RealFlight

Fly virtually anywhere, anytime

Aren't flight simulators great? They allow you to practice new maneuvers or just get some stick time when you can't make it to your flying field. One of our favorite pastimes is to log virtual flight time on Great Planes' RealFlight R/C Simulator during our lunch breaks. With the wide variety of available add-ons, you can find just about any type of model you'd ever want to fly. For us, it's a great way to keep our flying skills sharp. **Price—\$229.99.**



## 21st Century Sealing Iron

The heat is on!

When you cover an airplane with heat-shrink film, you need a covering iron that's easy to maneuver into tight areas and—most important—that accurately holds its temperature. The 21st Century Sealing Iron that we use in the office is a few years old now, and it still works as though it was brand new. What more can you say about a product that's as faithful as Old Yeller? **Price—\$36.99.**



## Slimline M1 Gas Pump system

Fill 'er up!

Around here, we fly and run a combination of glow- and gas-powered planes. This means that each fuel container must be compatible with nitro and gasoline. For our gas-model needs, we've found the Slimline M1 Gas Pump system to be just about perfect. The unit is self-contained and comes complete with all hardware and a manual pump that's gas-compatible. One-, 2.5- and 5-gallon jugs are available; the 1-gallon size keeps us going for a full day of action. **Prices—\$49.99 to \$59.99.**



## Hangar 9 Micro Digital Tach

Pocket-size engine-tuning tool

We've learned that having a tachometer on hand to tune our engines for a photo session is essential for reliable performance. After all, the last thing we need is for the engine to falter during a photo pass—not good! For reliable performance, you need a reliable tach, and Hangar 9's Micro Digital Tach has served us well. It's small, and the LCD screen is easy to read—even in bright sunlight. We've dropped the tach a few times on hard surfaces such as concrete, and like a Timex watch, it just keeps on ticking. **Price—\$27.99.**





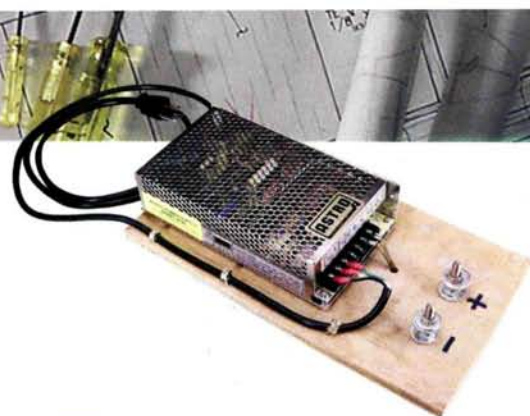


## Great Planes Ballwrench Sets

### Torque it down

Ball drivers are among the most indispensable tools on our workbench. An Allen wrench often isn't long enough, or it can't reach the bolt you want to tighten because it's placed at an awkward angle. We always have two Great Planes Ballwrench sets on our workbench—one standard and one metric. They're long, can reach many tight spots and, with their hardened, heat-treated steel tips, they'll last for many years.

**Price—\$13.99 (standard); \$11.99 (metric).**



## AstroFlight Model 120 Power Supply

### In-house powerhouse

If you're going to run a DC charger indoors on a regular basis the way we do, you're going to need a power supply. Our workhorse is AstroFlight's Model 120 Power Supply; it's rated at 12.5 amps @ 13.5 volts—plenty of juice to run two or three chargers at one time without difficulty (trust us, we've done it!). We mounted ours on a piece of plywood with a couple of bolts for terminals, and bingo; we're ready for any DC charger! **Price—\$75.**

## PFM Adhesive

### Stick to it

If ever an adhesive had a million and one uses, it's PFM. It will stick anything to just about anything else. We've used PFM to affix plastic to balsa, repair cracks in fiberglass and even to plug leaky glow-fuel tanks. It sets up in about 30 minutes, so it's awfully handy for field repairs. PFM is a one-part adhesive, so it's ready to use at a moment's notice, and it's also non-toxic and nonflammable. **Price—\$12.90.**



## FMA Supernova

### A familiar star still shines

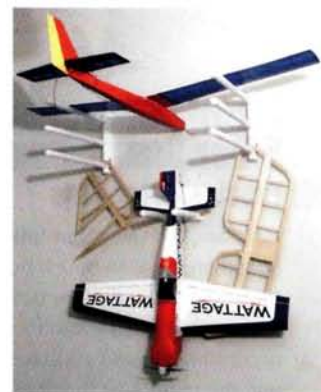
We've listed the Supernova among our favorite chargers for the better part of two years now, but until another unit that offers as many features and is as easy to use for the price comes along, we're not going to stop using it—or praising it! When something needs charging in the office, the Supernova gets the call; it handles everything from tiny micro-flyer Ni-Cds and NiMHs to giant, 12V, lead-acid batteries. It's fully automatic, so most charging requires nothing more than the push of a button. We have yet to experience a problem with it, and aside from lithium cells, we haven't encountered a charging task it can't handle. **Price—\$128.50.**



## Hangar 9 Airplane Storage Racks

### Handy-dandy convenience

We have pretty cool jobs; where else can you work and get paid to fly—and write—about model airplanes? Having a lot of models in the office can lead to a storage problem, though, so several months ago, we



mounted a set of Hangar 9's Storage Racks on a bare wall. Now, we don't know what we'd do without them. They're easy to mount and even easier to use, and they're versatile, too; the wing racks can be spaced to accommodate wings in sizes that range from park flyers to giant scale. The racks do a great job of keeping our models out of harm's way. **Price—\$5.95 (fuselage rack); \$9.95 (wing rack).**

## Thunder Tiger CarryMaster

### Keep it all together

Don't you hate it when you get that nagging sensation that you've forgotten something, and you're already halfway to the field? About the only thing worse is getting to the field and finding out that what you forgot is something you can't fly without! That's why we love the CarryMaster from Thunder Tiger; the molded case has pockets for the included fuel pump, glow starter, heavy-duty starter and 12V gel-cell to power them. The set also includes a 4-way wrench, a 3-liter fuel cell, recoil fuel tubing and chargers for the gel-cell and glow starter. You can tell at a glance whether anything is missing, and it all fits neatly in the case for transportation to the field. This one is a keeper. **Price—\$99.**







## Great Planes Easy-Touch Sanders

### Sanding solutions

I don't think any of us enjoys sanding, but we all know that it's necessary for a good-looking finished model. Great Planes' Easy-Touch Sanders are advertised as being designed for sanding comfort. Well, the sanders do have ergonomic handles that are easy to grip and hold, but we like them for another reason: their speed. The smooth, hard, flat sanding surface of the sander combined with its Easy-Touch adhesive-backed sandpaper quickly cuts away unwanted balsa. This leaves a smooth, flat surface that's ready to be covered or painted. Any tool that can reduce sanding time is one we like to use. **Prices—\$4.49 (5.5 and 11 inch); \$6.99 (22 inch); \$9.99 (33 inch); \$14.99 (44 inch).**

## Great Planes CG Machine

### Easy, accurate balancing

The Great Planes CG Machine is, without a doubt, the easiest way to accurately balance a plane. After all, every plane needs to be balanced; why not make it a little easier on yourself? The CG Machine is so adjustable that you can easily balance small park flyers or 1/4-scale giants on it. Using the built-in rulers, you can position the plane precisely on the recommended center of gravity and eliminate any guesswork. **Price—\$24.99.**



## Du-Bro Tubing Bender

### Fuel lines without kinks

Every time one of us installs a fuel tank in a new model, we use this tool. The tubing bender can bend a 90-degree angle in brass or other soft-metal tubes without crushing or kinking it. How many times have you tried to bend the vent tube in the fuel tank only to end up with a kink in it? Then, when you try to bend it out with pliers, it cracks apart and leaves you with a jagged edge. It's happened to us many times. The Du-Bro Tubing Bender makes nice, round, smooth bends in all kinds of tubes and tubing. **Price—\$9.49 (1/8 inch); \$12.29 (5/32 inch).**



## Fourmost Products Miter Saw & Sander

### Precise miter cuts

Here are two tools that take up little space on the workbench but greatly contribute to making you a better builder. Both the miter saw and the sander can accurately cut and sand any angle. We use the miter saw to cut an accurate angle on the wood piece and then use the sander to give the end grain a smooth and—most important—square finish. This makes for a nice, tight joint with a better glue bond that will last longer and hold stronger. We also use the miter saw to join two short spars to make a longer one (for large models). Overlap the ends on the saw, make your angle cut, and you'll have two perfectly matched ends ready to be glued. **Prices—\$19.69 each.**

## Dremel Rotary Tool and Robert Rough'n'Tough Carbide Cutters

### Fast balsa removal

The Dremel rotary tool is a staple on most workbenches—including ours. All of us use the rotary tool on just about every model-building project. The Robert Rough'n'Tough Carbide Cutters are always attached to the front of our Dremel tools. These carbide cutters are virtually indestructible and are available in seven shapes. They don't wear out, load up, or overheat, and when we need fast balsa removal, they do the job. **Prices—\$77.99 (Dremel rotary tool); \$7.95 (Robert Rough'n'Tough Carbide Cutters).**



## JR MatchBox

### Power distribution & servo matching

Here's a product that we didn't know we needed until we got one; now, we use it all the time. Many of us are into large-scale planes that require two or more servos on a control surface. The MatchBox allows us to adjust each servo independently so all of the servos on the control surface work in harmony. A big plus is that the MatchBox also lets you power the servos with a separate auxiliary battery pack. **Price—\$69.99.**



## Sonic-Tronics Nifty Gasoline & Super X Fuel Pumps

### Pump you up!

Here's something that none of us can live without; after all, we have to fill up our tanks before every flight. The Sonic-Tronics Super X pump has been a primary fuel pump around here for quite a while, but until recently, those of us who fly with gas-powered engines had to fill up our gas tanks with a hand pump. The new Nifty Gasoline Pump has given the gas guys a new electric option for filling those tanks quickly and safely. Now we can all fill our tanks in harmony.

**Prices—\$79.95 (Nifty Gasoline); \$29.95 (Super X).**



## Sullivan Products Megatron

### Muscle up!

OK, we admit it; starting a big gas engine can be a real pain in the shoulder! Instead of starting a new exercise regimen, we began using the Sullivan Megatron—a giant-size electric starter that's perfect for our gas burners. This unit comes with a 3-inch aluminum cone and a sure-grip silicone rubber insert, and steel endplates prevent its powerful motor from slipping under load. The Megatron can turn over gas engines that have up to 8ci displacements, and it uses a 12 or 24V power source. Not only does the Megatron keep our pride intact at the field, but using it is much safer than trying to start an engine by hand, as well (trust us; we know!). **Price—\$169.99.**

## FMA Direct Co-Pilot

### Infrared autopilot

When we're test-flying planes near the office, everyone wants to get in on the fun—artists, accountants, student interns ... folks who have never even held a transmitter before. We love to share the hobby, but put our planes on the line? No way! Now there's an easy solution that keeps everyone happy: the FMA Co-Pilot. It's an infrared-sensing, two-axis, onboard stabilization unit—a long way of saying that it will keep your model's wings level so that even a newcomer can easily fly it. Plug this nifty device into your RC system, attach the connected sensor to the underside of your plane, and voilà! Your plane will almost fly (and land!) itself. Our coworkers enjoy their flight time, and we can sit back and relax. **Price—\$119.95.**



## Hitec RCD Eclipse with Spectra Module

### Lots of planes, one transmitter

The best part about having a programmable radio such as the Eclipse is that it works with all kinds of models, from simple, 3-channel flyers to more complex, multi-channel planes. But what we really like about the Eclipse is its Spectra frequency-synthesizer module: we can fly all types of models on any channel without switching out receivers. That's a big plus when you review as many planes as we do! In addition, the Eclipse features 7-model memory, servo-reversing, endpoint adjustment, exponential rates, preprogrammed mixes and more. What's not to like? **Price—\$230.** †



**21st Century;** distributed by Great Planes.  
**AstroFlight Inc.** (310) 821-6242;  
[astroflight.com](http://astroflight.com).

**Du-Bro Products** (800) 848-9411; [dubro.com](http://dubro.com).  
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(800) 637-7660; [greatplanes.com](http://greatplanes.com).

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**Sirius Electronics;** a division of Peak Electronics  
Inc. (858) 679-4952; [siriuselectronics.com](http://siriuselectronics.com).

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**Top Flite;** distributed by Great Planes;  
[top-flite.com](http://top-flite.com).





# Zen - 120

No.: A112

**Donny Wright**

**2002 District VII  
Championship Contest  
Masters Class Winner**

**Flew a Zen to first place**



2002 NSRCA  
DISTRICT VII CHAMPIONSHIPS  
November 9-10, 2002 / Morgan Hill, CA  
1<sup>ST</sup> PLACE  
Masters Class



Inside the fuselage



Tune-pipe can be installed under  
the latched fiberglass belly pan



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## SPECIFICATIONS

Wing Span: 71.0 in / 1800 mm

Wing Area: 955 sq in / 61.6 sq dm

Flying Weight: 10.0 lb / 4500 g

Fuselage Length: 71.5 / 1820 mm

Engine Required: 4C 1.20 cu in

Radio Required: 5 channels, 6 servos



Aluminum  
Spinner



3-D transparent  
template

All balsa and wood construction  
Premium hand-ironed on covering  
(3 color schemes)

One piece rib-wing

All necessary hardware included

Anti-vibration engine mount and  
aluminum spinner provided

Latched fiberglass belly pan for  
housing tune-pipe

Pre-installed retractable landing gears

Pull-pull rudder control

Hand-painted fiberglass cowling with  
3-D transparent template



Pre-installed retractable  
landing gears



Pull-pull controls on rudder  
and elevator for more precise  
control. Elevator bellcrank  
to eliminate any differential  
throw



Anti-vibration engine mount  
comes with blind nuts already  
installed at the firewall







# TOPGUN



WINNER MASTER JEFF FOLEY ME-109E



# 15th annual scale showdown for the best of the best!

Judges and spectators alike found George Malorana's Tu-4 to be a real attention-getter. Essentially a Russian copy of a B-29, this model was the only electric at Top Gun this year. Its rotating radar dish helped it earn the Engineering Excellence award and third place in Team with Dave Pinegar at the sticks.



PHOTOS BY JERRY SMITH, MATT ROYD & GERRY YARRICH

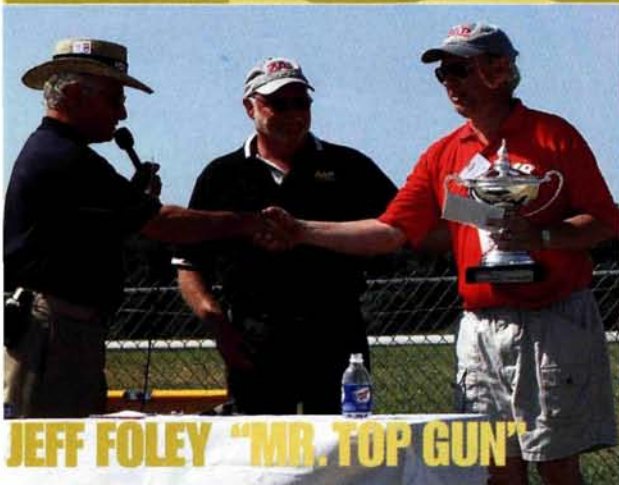
When you hear the words "Top Gun," you think of someone who is the very best at what he does: banging away at the target aircraft. But Top Gun is also a scale contest at which the very best scale RC builders and fliers from all over the country—and the world—come to do battle. Not just a scale meet, Top Gun is a "by-invitation-only" competition for which fliers must earn the right to be considered. Top Gun is the very best of the best competing for the highest honors.

For 15 years, the major Top Gun sponsors have been *Model Airplane News* and Pacer Technology (Zap glue), and over the years, the event has garnered an impressive list of supporters without whom it could not function. Top Gun 2003 was held in late April at the impressive Lakeland Linder regional airport in Lakeland, FL. This site has proven to be the best ever and is truly ideally suited to Top Gun's high standards. It provides a wide-open flying area with no restrictions on the pilots or on the planes.

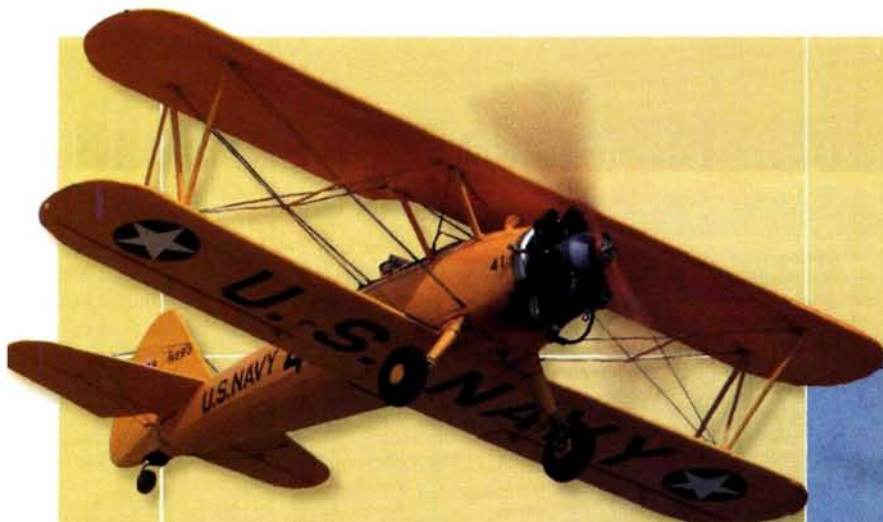
Top Gun is as much a social event as it is a contest. A lot of work is involved in accommodating 70 to 80 contestants and making everything work out smoothly. Sixteen paid judges, several scorekeepers and the many members of the host Imperial RC Club all make it come together. A staff of five sets everything up and tears it down, and 10 dedicated workers cover every chore from parking cars to latrine duty.

# 2003

by Jerry Smith







Left: what a realistic-looking model! Lloyd Roberts' PT-17 was finished in Navy colors. Built from Zivoli plans, the G-38-powered biplane weighed 23 pounds and was Lloyd's backup and practice plane! Bottom left: looking as if you could just step inside and take it for a spin, David Hayes's Rockwell Thrush crop-duster was beautifully detailed, all the way down to its spraybars! The 107-inch Saito 1.80-powered model earned David fourth place in the Master class. Bottom right: It's hard to imagine a more accurately rendered instrument panel than the one on Lloyd Roberts' Fly Baby. It helped him net the Master's High Static and Craftsmanship awards as well as third overall in the Master class.

Spectators have a dizzying array of activities from which to choose at Top Gun. More than 60 manufacturers were on hand, creating an atmosphere similar to that of a mini trade show and a virtual hobby shop combined.

The grandstand afforded all a great view of the action. Announcer Sam Wright kept everyone informed of the events scheduled throughout the day, and for those who wanted to see the models up close, a pit pass was the ticket to mingle and talk to the pilots about their airplanes.

The noontime show is also great to watch; it provides entertainment by some of the best demo pilots in the world. You just have to see it all to really appreciate this extravaganza of precision RC scale and aerobatics! It's well worth the price of admission!

Special thanks to the hosts—the Imperial RC Club—and to contest director Mike Zubricky, Dell Pratt and the many volunteers. Most of all, thanks to Frank Tiano, who worked tirelessly for our pleasure. If you've never attended Top Gun, mark your 2004 calendar; it's always the last weekend in April. You'll have the time of your life observing the wonderful world of realistic scale aircraft built by the best craftsmen in the world. As always, Top Gun remains the "must-see" scale event—period!

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AND INFO ON TOP GUN,  
TAKE THE CLICK TRIP!



Seventh in the Master class, Richard Feroldi flew his impressive Albatross D5 shown here during a slow flyby. The 118-inch-span model weighs 35 pounds and is powered by a Sachs 5.8ci gas engine. Richard also won the Best Biplane award.





Right: this seldom modeled 1/4-scale Fokker D-VI earned builder/designer David Johnson 12th place in the Masters class. Powered by a U.S. Engines 41cc gas engine, the 75-inch biplane is covered in authentic German lozenge-pattern material from Glenn Torrance Models. It earned a respectable 94.083 static score. Bottom upper left: this P-38 Lightning, built and flown by Dennis Crooks, had a 114-inch span, Husky 3.3ci engines and Robert retracts and was built from Ziroli plans. It won the Best Gas Performance trophy. Bottom left: flown by Martin Hendrickson in Expert, this Beech T-34A Mentor has a 109-inch span and a Zenoah GT-80 for power and weighs 52 pounds. Martin placed seventh. Bottom right: details such as the sliding window and intricate scale switchgear earned Graeme Mears the Team High Static score as well as the overall win for the class with pilot Dave Patrick.





## TOP GUN SCORING

Top Gun has three classes of competition. In Expert, the builder and pilot must be the same person. The Master class is for builders who have drawn their own plans and built their models entirely by themselves. In Team, the pilot and builder are different people who may both work on the model.

The judging parameters for Top Gun are slightly different from those of most other AMA scale contests. The static judging score sheets consist of four sections instead of three. Thirty points are awarded in each of three categories: Outline, Color and Markings and Craftsmanship. Then there is a separate, 10-point category for Realism. A requirement is a documentation presentation book, by which the model is judged. Three judges view the model from a distance of 15 feet and scrutinize its side, front and top views while a fourth judge stands right next to the model to evaluate craftsmanship and

realism. The judges are not allowed to touch the model. The "Builder-of-the-model" rule is strictly enforced at Top Gun, and the model must be flown by its builder unless it is entered in Team.

## FLIGHT SCORES

The flight portion of the contest includes four rounds of flying; two on Saturday and two on Sunday. The maximum score for the 10 maneuvers is 10 points each, for a possible perfect score of 100. The lowest flight score is discarded, and the remaining three rounds are averaged for a final flight score. The contestant must fly four mandatory maneuvers and five optional maneuvers for a total of nine maneuvers. Flight realism (worth a maximum of 10 points) is also judged and is added to the total flight score. Each flight has a time limit of 15 minutes.

The four mandatory maneuvers are takeoff, slow flyby, fast flyby and



landing. The five optional maneuvers should be prototypical of the full-scale aircraft. Some of the maneuvers are: prototypical taxi out and back, figure-8, strafing run, inverted flyby, touch-and-go, overshoot to landing and a descending, 360-degree circle. You wouldn't expect to see a B-29 bomber do a roll or a spin, or fly an inverted low pass; the idea is to impart realism during flying. The total contest score is the sum of the static score and the flight score.

The official Top Gun rulebook is well defined and covers all aspects of the event. Over the past 15 years, it has been revised and amended many times to eliminate cheating and to provide an equitable platform for all contestants.



Above: with so many fine-quality models competing, the job of a Top Gun judge is not an enviable one. Left: Jeff Foley presents his Bf-109 E for Static judging while the Craftsman judge examines its tail. The judge must have liked what he saw because Jeff eventually walked away with the big trophy and the title of "Mr. Top Gun."

PLACE	PILOT	AIRCRAFT	WINGSPAN (IN.)	WEIGHT (LB.)	POWER	PROP
<b>EXPERT</b>						
1	Joe Rafalowski	F-100	70	35	Jet Cat 160	—
2	Kim Foster	de Havilland Moth Minor	110	15	Laser 150	Zinger 18x5
3	Dennis Crooks	P-38 Lightning	114	45	Husky 3.3	Zinger 22x10
4	Tommy Wood	F-18C	72	44	RAm 1000 (2)	—
5	Gustavo Compana	L-159	68	30	T 1000	—
6	Tim Redelman	F-4 Phantom	57	28	Jet Cat	—
7	Martin Hendrickson	Beech T-34A Mentor	109	52	GT 80	Bolly 24x10
8	Al Kretz	Spitfire Mk. 16	88	25	Moki 1.8	Zinger 18x8
9	Lee Rice	Corsair F4U-1D	76	20	O.S. 1.08	APC 15x6
10	Doc McCallie	FW-190 A3	94	33	D&B 3.7	Mejzlik 22x10
11	Tom Czikk	P-47D Razor Back	92	38	3W 75	Moki 26x10
12	David Wigley	Hawker Tempest Mk. 5	96	45	Q-75	Bolly 3B 22x12
13	Joe Denicola	P-47N	98	41	3W 75	Moki 24x10
14	John Chevallier	Ryan STM-S2	93	21	U.S. 35	Zinger 18x10
15	David Voglund	Me-110	118	39	Laser 150	Graupner 15x8
16	Mike Winter	Sopwith Pup	106	53	G-74	Zinger 24x10
17	Steve Ort	B-25 Mitchell	101	32	O.S. 1.08	Zinger 16x6
18	Sean Cassidy	Hellcat F6F-5	80	29	G-45	Moki 18x8
19	Gerardo Galvez	Stearman	60	12	Saito 91	14x8
20	Mike Hipwell	Spitfire Mk. 14C	88	26	Moki 1.8	APC 18x8
21	Art Johnson	P-36C	84	18	Moki 2.10	APC 20x10
22	Paul McCaulley	F-100D	70	30	Jet Cat 160	—
23	Tripoli Golasso	B-26B Invader	126	52	G-38	18x10
24	Jon Hay	C-47	140	43	Saito 180	16x8
25	Ray Kleber	Ki-84 Nakajima	88	32	G-62	APC 22x10
26	George Bartkus	Fw-190 F8	80	22	Moki 1.8	APC 18x8
27	Rod Snyder	Lear 35	82	36	Jet Cat 80	—



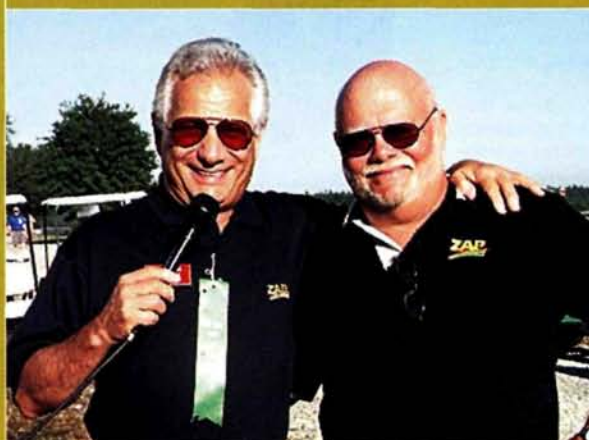


Tom Dodgen pilots Sam Snyder's unique de Havilland Swallow to sixth place in Team.

# TOP GUNTECH

## BIG-GUNS

Don't let those relaxed smiles fool you; these are the two busiest men at Top Gun every year! On the right is the granddaddy of Top Gun, Frank Tiano—the guy who dreamed up the idea 15 years ago and has been the driving force behind making it what it is today: one of the world's premier scale events. On the left is "the golden voice of Top Gun," Sam Wright, whose knack for keeping the audience entertained when the pace slows down and on top of the action when it picks up is a big part of the event's success. From the time the first plane takes off until the last one lands, these two guys are hard at work making sure everyone there gets a topnotch show from start to finish!



### AIRCRAFT TYPE

Military.....	53
Jets .....	11
Multi-engine .....	9
Biplanes.....	7
Civilian .....	7

### TURBINES

Jet Cat .....	6
AMT .....	3
FTE T1000 .....	1
RAm .....	1

### PROPELLERS

Zinger .....	13
Moki .....	9
APC .....	8
Mejzlik .....	3
3W .....	2
Bolly .....	2
Dyna Thrust .....	1
Graupner .....	1
Master Airscrew .....	1
Homemade .....	1

### ERA

WW II .....	31
Post-WW II .....	11
WW I .....	5

### RADIOS

JR .....	28
Futaba .....	25
Airtronics .....	6

### ENGINES

Moki .....	8
3W .....	7
Zenoah .....	7
Saito .....	4
Laser .....	3
O.S. ....	3
Quadra .....	2
U.S. Engines .....	2
BME .....	1
Brison .....	1
D&B .....	1
Fuji .....	1
Husky .....	1
Robart Mfg. ....	1
Sachs .....	1
Webra .....	1
YS .....	1

### RETRACTS

Robart Mfg. ....	16
BVM .....	7
Homemade .....	5
Century Jet Models ....	3
Gene Barton .....	3
Yellow Aircraft .....	2
Auni .....	1
Custom-made .....	1
Dave Platt Models ....	1
PCM Models .....	1
RT Aerospace .....	1
Sierra Precision .....	1
Vailly Aviation .....	1
Waldi .....	1

RADIO	PLANS/KIT	GEAR MFR.	STATIC	FLIGHT	TOTAL
JR	BVM	BVM	96.083	91.795	187.878
Futaba	Jerry Bates plan	Robart	95	92.625	187.625
Futaba	Zirol plan	Robart	94.333	92.125	186.458
JR	Yellow Aircraft	Yellow Aircraft	93.25	92.875	186.125
Futaba	Walter Godez	Franz Walldi	96.083	89.711	185.794
JR	BVM	BVM	93	90.528	183.528
JR	Own design	Robart	92.75	88.958	181.708
Futaba	Yellow Aircraft	Yellow Aircraft	91	90	181
Airtronics	Holman/Royal	Aune	93.75	86.875	180.625
JR	Vailly	Vailly	91.833	88.583	180.416
JR	Vailly plan	Robart	91.583	88.625	180.208
Futaba	Vailly	Scratch-built retracts	95.667	83.208	178.875
JR	Zirol plan	Gene Barton	87.833	90.208	178.041
Futaba	Fred Reese plan	—	91.417	84.625	176.042
JR	Don Smith plan	Century Jet	87.583	87.375	174.958
Futaba	Balsa USA	—	92.333	82.333	174.666
JR	Zirol plan	Robart	87.5	85.75	173.25
Futaba	Don Lien plan	Robart	94	78.25	172.25
Futaba	Sterling	Robart	93.833	71.292	165.125
JR	Dave Platt	Century Jet	89	72.292	161.292
JR	Jerry Bates plan	Robart	88.667	53.042	141.709
JR	BVM	BVM	92.75	48.674	141.424
Futaba	Don Smith plan	Century Jet	84.75	25.5	110.25
Futaba	Zirol plan	Robart	81.417	28	109.417
Futaba	Aerotech	Robart	93.25	7.833	101.083
Futaba	Bob Holman Plans	Scratch-built retracts	86.917	0.083	87
JR	Mark Frankel	Custom-made	84.833	0	84.833



A highlight of the weekend for competitors and spectators was the warbird demonstration during the halftime show. No fewer than 11 warbirds—mostly of WW II vintage—took to the skies at once, dodging and dicing around the field, simulating a dogfight with realism befitting a scale contest such as Top Gun. A wide variety of American, British, German and Japanese combat aircraft was on display, and some of the pilots choreographed sequences with multiple aircraft to simulate bomber-escort duty or intercept missions. Axis aircraft would land after being “downed” by Allied planes, and the skies gradually became safe for the highlight of the show: Doug Smith’s stunning B-17, piloted by Dean DiGiorgio. As part of the script, the B-17 took a couple of “hits” from one of the pursuing fighters, but with typical “Flying Fortress” fortitude, it managed to stay aloft, albeit with some ominous smoke puffing from one of the outboard engines and only one gear lowered for landing. Dean showed awe-inspiring precision as he made multiple passes for the crowd right down on the deck—and we mean on the deck. He performed touch-and-go’s with that single gear wheel rolling along the runway for 200 feet while he kept the other wing just inches off the tarmac! The plane was so steady during the maneuver that you’d swear there must have been an invisible gear wheel on the other side. Then, with spectators shaking their heads in wonder, Dean brought the B-17 back around, kicked down the other gear wheel and greased it in as calmly as if the whole sequence were part of everyone’s landing procedure.



*Above: Dean DiGiorgio displayed his amazing flying skills when he balanced Doug Smith's B-17 on one gear wheel down the entire length of the runway. Left: a flock of warbirds (many built from Zirolli plans) awaits its turn during the halftime show. Right: the Warbird demo was a real highlight. If you think the staging area looks crowded, imagine how the sky looked with all of these planes in the air!*



PLACE	PILOT	AIRCRAFT	WINGSPAN (IN.)	WEIGHT (LB.)	POWER	PROP
<b>MASTER</b>						
1	Jeff Foley	Bf-109 E	86	25	Moki 2.10	Moki 20x8
2	Bob Violett	F-100F	69	36	AMT Olympus	—
3	Lloyd Roberts	Fly Baby (Roberts)	108	32	Kavan	Dynathrust 22x8
4	David Hayes	Rockwell Thrush	107	27	Saito 180	APC 18x6W
5	Patrick McCurry	Me-109 G10	101	40	3W 70	Moki 22x12
6	Hal Parenti	Fireball Ryan F-1	72	19	YS 120	APC 16x8
7	Richard Feroldi	Albatross D5	118	35	Sachs 5.8	Moki 26x10
8	Bud Roane	Sopwith 1½ Strutter	134	35	Saito 450	Zinger 24x8
9	Bob Patton	T-28C	114	52	3W 100	3W 28x10
10	Nick Zirolli Sr.	Stearman	87	32	Robart Radial	Zinger 26x12
11	David Platt	Val Aichi D3A-1	113	27	Moki 2.10	APC 22x8
12	David Johnson	Fokker D6	75	15	U.S. 41	Master Airscrew 20x8
13	Walter Moucha	Dauntless SBD-3	120	51	3W 150	30x10
14	Eddie Newman	Fieseler Storch	112	25	Laser 200	18x6
15	Tom Polapink	Pfalz D3A	74	14	O.S. 120	Zinger 16x6
PLACE	PILOTS	AIRCRAFT	WINGSPAN (IN.)	WEIGHT (LB.)	POWER	PROP
<b>TEAM</b>						
1	Graeme Mears/Dave Patrick	Super Cub PA-18 (1987)	144	45	Moki 3.6	Mejzlik 24x10
2	Joe Grice/David Schulman	F-100D	69	34	AMT 450	—
3	George Maiorana/David Pinegar	Tu-4 (Russian B-29)	115	30	Electric	4B homemade
4	Wayne Siewert/Scott Russell	P-47 Thunderbolt	82	32	Brisson 4.2	Zinger 22x10
5	Tony Urbano/Dean DiGiorgio	Corsair F4U	92	35	G-62	22x8
6	Sam Snyder/Tom Dodgen	de Havilland Swallow	98	32	Jet Cat 120	—
7	Paul Donofrio/Anthony Greco	Monocoupe 110 Special	118	47	3W 120	Zinger 32x10
8	Mark Taylor/Paul Bageman	F-100	69	32	Jet Cat 120	—
9	Gary Allen/Dorin Luck	Bucker Bu-133	86	23	G-62	3W 24x10
10	Jim Hammond/Brian O'Meara	KI-61 Tony	86	17	Webra 120	Moki 16x8
11	Mike Selby/Kalvin Lim	Tigercat F7F-2D	122	45	BME 80	Mejzlik 3B 22x10
12	Mike Hapsas/John Christensen	Tigercat F7F-3P	122	54	3W 48 B2	Moki 22x10



A speedy Japanese Zero strafes the Top Gun flightline during the halftime warbird show!

# WARBIRDS OVER TOP GUN



RADIO	PLANS/KIT	GEAR MFR.	STATIC	FLIGHT	TOTAL
JR	Own design	Platt	96.5	93.25	189.75
JR	Own design	BVM	95.667	93.1	188.767
JR	Own design	—	98.583	88.875	187.458
JR	Own design	—	93.917	92.583	186.5
JR	Own design	PCM Models	94.5	91.625	186.125
Airtronics	Own design	Robart	92.917	90.875	183.792
Futaba	Own design	—	97.333	85.083	182.416
JR	Own design	—	92.083	90.25	182.333
Futaba	Own design	Robart	92	89.458	181.458
Airtronics	Own design	—	90.5	90.208	180.708
JR	Own design	—	95	83.167	178.167
Futaba	Own design	—	94.083	75.5	169.583
Airtronics	Own design	Likes Line	73.167	90.25	163.417
Futaba	Own design	—	95.417	40.708	136.125
Airtronics	Own design	—	95.833	12	107.833
RADIO	PLANS/KIT	GEAR MFR.	STATIC	FLIGHT	TOTAL
Futaba	Own design	—	98.583	94.625	193.208
JR	BVM	BVM	98.417	94.693	193.11
Futaba	Own design	Scratch-built retracts	96.75	91.917	188.667
Futaba	Aerotech	Robart	97.5	87.917	185.417
JR	Ziroll plan	Robart	92.75	92.292	185.042
JR	Own design	Scratch-built retracts	94.5	90.292	184.792
JR	Vern Clemens plan	—	94.75	89.833	184.583
JR	BVM	BVM	92.667	86.975	179.642
Futaba	Allen design	—	93.083	86.542	179.625
Airtronics	Don Smith plan	Gene Barton	92.167	84.75	176.917
JR	FFC	Robart	95.333	30.042	125.375
Futaba	FFC	Robart	94.833	0	94.833



# TOPGUN HALFTIME

Right: Mac Hodges (left) and Dan Stevens work on the showstopping B-29 Super Fortress. Mac is the pilot, and Dan designed and built the B-29 over a period of eight months. Modeled after the original "Fertile Myrtle," the B-29 is made entirely of foam and is covered with sheet balsa and fiberglass cloth. It has a 20-foot span and is powered by four ZDZ 80cc engines. It weighs in at just under 100 pounds.



As usual, Quique Somenzini's half-time aerobatic display seemingly disproved Sir Isaac Newton's laws—much to the delight of the crowd! Quique once again showed why he is one of the best RC pilots in the world. Below: much of the halftime show was executed by these great flying show planes from Lanier RC.



Here, "Captain Salami"'s ground crew poses with the sound-barrier-breaking model. Left to right: brothers Jason and David Shulman (who between them have more piloting skill than any family has a right to!), sound effects maestro Bill Deverna and the voice of "Captain Salami": Frank Tiano.





Right: piloted by Dan Stevens, the Bell X-1 lights its candle to zoom back up to altitude—impressive show!

# SHOW



## SPONSORS

### Primary

Model Airplane News  
Pacer Technology (Zap)

### Major

Airtronics  
O.S./Futaba

Robert Mfg.  
FTE Turbine Works  
JR Radio  
The Gunner's Mate

### Associate

Bob Violett Models  
Nick Zirolli Plans

### Supporting

Aircraft Intl.  
Aerotech Models  
Dave Platt Models  
Dixie Cutrone  
Gerard Enterprises  
Pro-Mark  
RC Report

Saito Engines  
RC Scale Intl.  
Sheraton 4 Points Hotel  
Top Gun Hussies  
Van Dell Jewelers  
Tamiya

The daily halftime show is a longtime tradition at Top Gun. The ringleader of this flying circus is Lanier RC's infamous Bubba Spivey, and he runs a pretty tight ship. There's never a dull moment as Bubba manages to get all the aerobatic models and demonstration flights running with military-like precision. World-class aerobatic pilots perform with the highest degree of aerobatic finesse and make giant-scale Tournament of Champion-class aircraft do amazing things. Jason Shulman, Quique Somenzini and Bransom Fairchild took turns amazing the audience with their piloting prowess! Bubba Spivey and Wayne Voyles team up for hot formation aerobatics. They fly a pair of giant Lanier RC Staudachers, and if you think aerobatics are exciting, try doing them with two airplanes flown in perfect sync! Even their landings were simultaneous—right next to each other!

The world's smallest turbine-rated pilot, "Capt. Salami," was also on hand and tried to break the scale sound barrier. This intrepid little aviator flies a black BVM Super Bandit and makes several super-low passes while chatting with the crowd on his radio! There's even a scale sonic boom to surprise the audience! The Super Bandit is actually piloted by David Shulman, and the voice of Capt. Salami is provided by none other than Frank Tiano. Bill Deverna handled the sonic-boom special effects.

Helicopters, warbirds, RC parachutists and unlimited aerobatics by an impressive electric-powered model are all part of the gig. This show-within-a-show gets larger in scope and quality of showmanship every year; there's something for just about everyone! ✚

CATEGORY	WINNER	AIRCRAFT	SPONSOR
<b>STATIC AWARDS</b>			
MASTER HIGH STATIC	Lloyd Roberts	Flybaby	Futaba
EXPERT HIGH STATIC (TIE)	Gustavo Campana	L-159	Pro-Mark
	Joe Rafalowski	F-100	
TEAM HIGH STATIC	Graeme Mears	Super Cub	BVM
BEST CIVILIAN	Graeme Mears	Super Cub	Sheraton 4 Points Hotel
BEST MILITARY	Joe Grice	F-100D	Aerotech
BEST BIPLANE	Rich Feroldi	Albatross	RC Report
BEST PRE WW II	Paul Donofrio	Monocoupe	Model Airplane News
BEST JET	Joe Grice	F-100D	JR Radio
BEST COCKPIT INTERIOR	Patrick McCurry	Me-109G	RC Scale Intl.
ENGINEERING EXCELLENCE	George Mariana/Charlie Chambers	Tu-4	Robert Mfg.
CRAFTSMANSHIP AWARD	Lloyd Roberts	Flybaby	The Zap Gang
GREY EAGLE AWARD	Nick Zirolli Sr.	—	The Gunner's Mate
TOP BUNS AWARD	Mike Hipwell	—	
CRITICS' CHOICE	Graeme Mears	Super Cub	Top Gun Hussies
CRITICS' CHOICE (RUNNER-UP)	Patrick McCurry	Me-109G	Airtronics & Van Dell Jewelers
			The Gunner's Mate
<b>FLIGHT AWARDS</b>			
BEST 2-STROKE PERFORMANCE	Jeff Foley	Bf-109E	Gerard Enterprises
BEST 4-STROKE PERFORMANCE	Hal Parenti	Ryan Fireball	Saito Engines
BEST GAS PERFORMANCE	Dennis Crooks	P-38 Lightning	Aircraft Intl.
BEST MULTI PERFORMANCE	Dave Voglund	Me-110	Model Airplane News
BEST JET PERFORMANCE	David Shulman	F-100D	FTE Turbine Works





## *Electric-powered Golden Age racer*

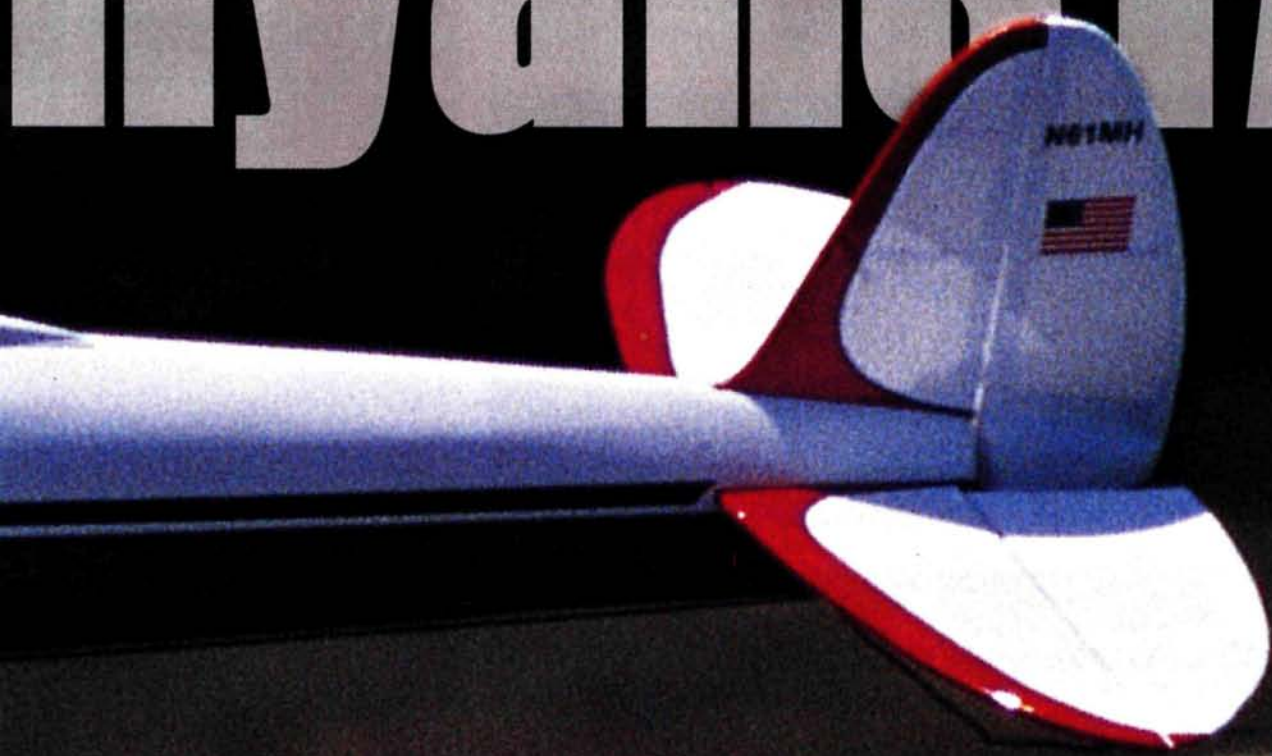
Lately, it seems that all the new models are almost ready to fly (ARF). Although I like these prebuilt models, I sometimes prefer to build a plane the old-fashioned way. So when the electric-powered Great Planes Ryan STA EP hit the market, I just had to have one. Since I've built many Great Planes kits, I knew this kit would be of good quality, and I wasn't disappointed. The Ryan is small enough to transport in the car or to fly in your own backyard.

After reading the instructions, I checked the kit to make sure that I had everything. Along with the high-quality balsa, plywood and basswood materials, I found a beautifully precision-formed cowl, wheel pants and headrest. Pleasantly surprised by the inclusion of these scale details, I headed for the workshop.



# GreatPlanes Ryan STA

by George Wendt



PHOTOS BY GEORGE WENDT



## GETTING STARTED

I started by building the stabilizer and rudder. These are made of  $\frac{3}{16} \times \frac{3}{8}$ -inch balsa sticks and  $\frac{3}{16}$ -inch die-cut pieces. If you follow the plans and heed the instructions, all the parts will go together without a problem. The die-cut parts fit well, and I finished the tail feathers in a very short time. A  $\frac{3}{32}$ -inch wire joiner connects the elevator halves.

• **Wing.** The wing is built with traditional balsa, lite-ply and basswood. I started the assembly by laminating the die-cast ply

are properly aligned with each other before the epoxy sets. To complete the wing construction, I added the ply wing hold-down bolt plates and built and installed the ailerons using CA hinges.

• **Fuselage.** The fuselage uses box-lock construction (every part locks into the next) and is quite simple to build. Pin the fuselage base over the plans and then add the formers and doublers. Remember to place all the formers with their embossed lettering facing forward. Use a pen to enhance the lettering to ensure that you



With the main assemblies complete, it was time to piece everything together to create the main airframe.

landing-gear doublers to the appropriate balsa ribs. Be sure to assemble a left and a right pair. Next, I shimmed up the main spar and pinned it into place over the plans. I then added the sub trailing edge and the ribs. The pre-cut trailing edge ensures that the wing remains straight while it is being built. I added the shear webbing and followed this with the top leading-edge center section and the trailing-edge sheeting.

At this point, I removed the wing from the building board and pulled out the rib tabs. I then sanded the wing to a smooth finish. Next, I installed the landing-gear rails and torque blocks, and I completed the bottom wing sheeting. I finished building the left panel by adding the wingtips and filler blocks and sanding everything to shape. Once I had finished, I repeated the process and built the right panel.

When you've finished both wing panels, join them using the two plywood dihedral braces. Make sure that the panels

don't install them backwards. The thrust line would be wrong if the formers were installed incorrectly.

Next, I added the  $\frac{3}{16}$ -inch balsa stringers to the lower portions of the fuselage. With this completed, I began to sheet the framework. I rarely enjoy this, but because the wood was so good, it went very well. When I had sheeted the bottom, I added the pushrod tubes by sliding them through the guide holes already built into the formers. When you cut the exit holes in the sheeting, be careful not to make the holes too big or put them in the wrong locations.

At this point, I removed the fuselage from the board and added the stringers to the top of the fuselage and then added the sheeting. I then sanded the fuselage to shape.

The next step was to assemble the battery-hatch cover. I glued the  $\frac{3}{32}$ -inch balsa hatch base together and then added the hatch-pin doublers. I placed the hatch cover on the fuselage with some wax

## SPECIFICATIONS

**MODEL:** Ryan STA

**MANUFACTURER:** Great Planes Model Mfg. Co.

**TYPE:** sport-scale electric

**WINGSPAN:** 49 in.

**LENGTH:** 36 $\frac{1}{4}$  in.

**WING AREA:** 401 sq. in.

**WING LOADING:** 20.1 oz./sq.ft.

**WEIGHT:** 3 lb., 8 oz.

**RADIO REQ'D:** 4-channel with 4 servos (elevator, rudder, throttle, ailerons)

**RADIO USED:** Hitec Eclipse 7-channel transmitter, 555 micro receiver, 4 Futaba S3002 servos and an ElectriFly C50 electronic speed control

**DRIVE SYSTEM REQ'D:** Speed 600 14-turn geared motor

**DRIVE SYSTEM USED:** Great Planes Speed 600 14-turn, reverse-rotation motor with gearbox

**PROP USED:** Master Airscrew 10x6

**BATTERY USED:** 7-cell, 1700mAh Ni-Cd

**PRICE:** \$69.99

**FEATURES:** all-wood construction; kit includes an ABS plastic cowl and wheel pants, a cockpit with clear canopy, photo-illustrated instructions and full-size plans.

**COMMENTS:** the Ryan is extremely easy to construct and a pleasure to fly. This is the type of model that will turn heads at any flying field.

## HITS

- Die-cut parts fit perfectly.
- Photo-illustrated instructions are extremely helpful.
- Alternative instructions are provided for glow conversion.

## MISSES

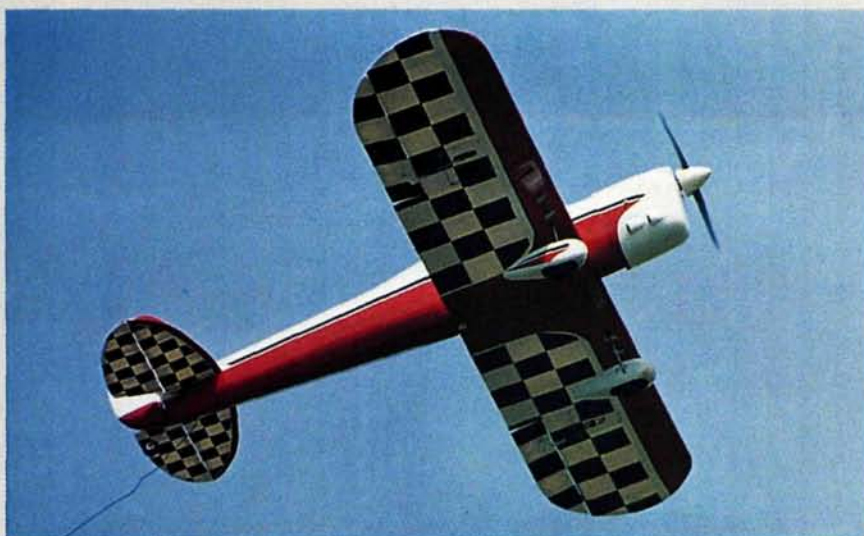
- Some wood was heavy.

paper between it and the fuselage to ensure that it would not be glued to the fuselage when I added the formers and the sheeting. Before removing the hatch cover, I sanded it to match the shape of the fuselage.

To complete the fuselage, all that was left to do was install the motor and tail feathers. With the bulkhead former installed as instructed, the required right thrust will already be built into the fuselage. The motor mount itself is a tab/jib assembly consisting of four lite-ply pieces.

Last, I covered the tail feathers and then added them to the fuselage, making sure that they were aligned with the wing. The instructions are very clear on this subject.





The day of the Ryan's first flight arrived at last, so I eagerly headed to the field to see how it would do. Because I usually fly off grass, I decided it would be best to hand-launch for the first flight. (Later flights proved that the Ryan has no problem taking off from grass.)

#### TAKEOFF AND LANDING

With the battery fully charged, I pointed the model into the wind, applied full power and gave it a

gentle toss. From the first moment it was airborne, the Ryan was rock solid. I simply added a little down-elevator, and it was flying extremely smooth and fast.

After four or five passes down the field, I decided to attempt a landing while I still had a fairly good charge and enough power to call on if I had to go around again. I lined up with the runway and started to reduce power. The Ryan settled in with no tendency to stall at all. It touched down and rolled out in about 20 feet and then came to a stop. Landings are a snap with this little airplane.

#### LOW-SPEED PERFORMANCE

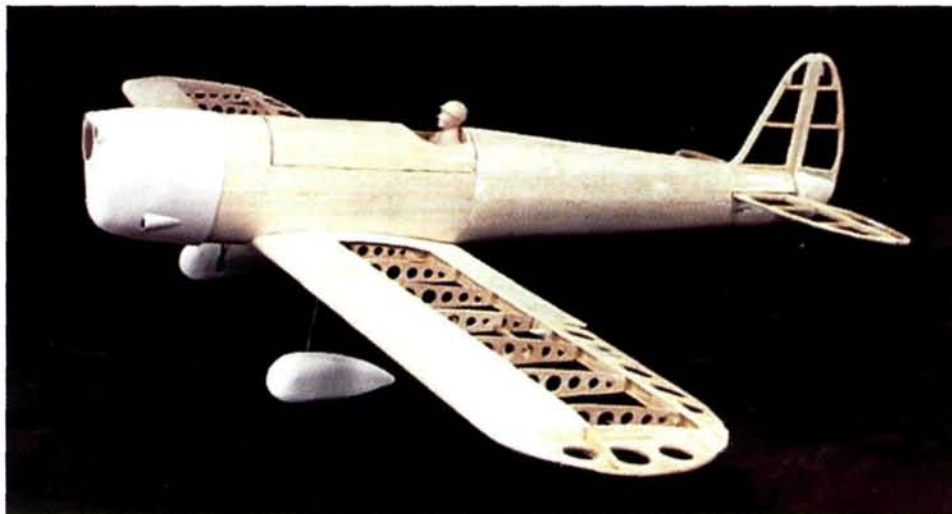
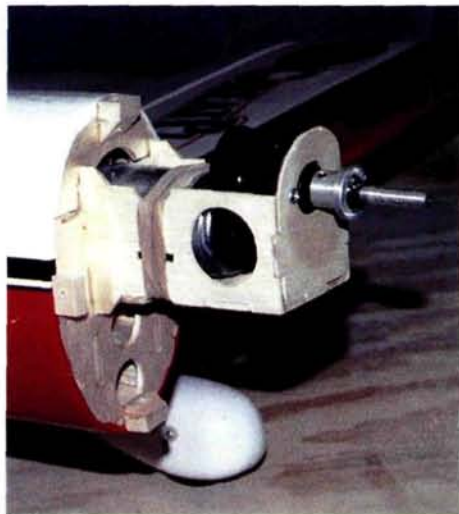
At low speeds, the Ryan didn't show any bad characteristics. I slowed it down to  $\frac{1}{4}$  power, and it stalled, but it was very predictable. I just added power, and it recovered almost immediately.

#### HIGH-SPEED PERFORMANCE

As I stated before, the Ryan is a very fast model. With all the controls set at the recommended throws, I found its performance outstanding.

#### AEROBATICS

The Ryan is capable of most aerobatics. I easily did loops, rolls, stall turns and inverted flight.



Left: If you follow the instructions, the 14-turn motor and gearbox will fit perfectly and install easily. Right: here, the Ryan is completely built up and ready to be covered.

• **Final assembly.** The wheel pants and cowl are made of ABS plastic. I assembled them according to the plans with no trouble. I covered the Ryan STA with Top Flite MonoKote using the colors and scheme depicted on the box. The instructions give several good tips on covering the model. The installation of the radio was straightforward and didn't cause any problems. I used my Hitec Eclipse 7 transmitter, a Hitec 555 micro receiver and 4 Futaba S3002 servos. The model uses 2 servos for the ailerons and 1 each for the rest of the surfaces.

The instructions give detailed instructions for both electric and glow power, but I chose electric. I mounted a Great Planes C50 elec-

tronic speed control with BEC and a 7-cell, 1700mAh Ni-Cd battery on the receiver in the fuselage using hook-and-loop fastener. For power, I chose the Speed 600 14-turn geared motor that's recommended by Great Planes. I easily installed the motor and gear drive following the instructions.

With this accomplished, I had only to balance the model. My Ryan came out slightly tail-heavy, and since there was no way to move the battery or any of the radio equipment forward, I had to add 2 ounces of nose weight before the plane balanced according to the plans. When I weighed my Ryan, it came out at about 4 pounds—heavier than the 3½ pounds predicted by Great Planes.

#### CONCLUSION

I found the Ryan STA to be an outstanding flyer and an all-around great-looking plane. I'm looking forward to many hours at the flying field with this one! ✈

*ElectriFly*; distributed by Great Planes; [electrifly.com](http://electrifly.com).

*Futaba*; distributed by Great Planes Model Distributors; [futaba-rc.com](http://futaba-rc.com).

*Great Planes* (800) 637-7660; [greatplanes.com](http://greatplanes.com).

*Hitec RCD Inc.* (858) 748-6948; [hitecrcd.com](http://hitecrcd.com).

*Master Airscrew*; distributed by Windsor Propeller Co. (916) 631-8385; [masterairscrew.com](http://masterairscrew.com).

*Top Flite*; distributed by Great Planes Model Distributors; [top-flite.com](http://top-flite.com).



# Lanier Mariner 40

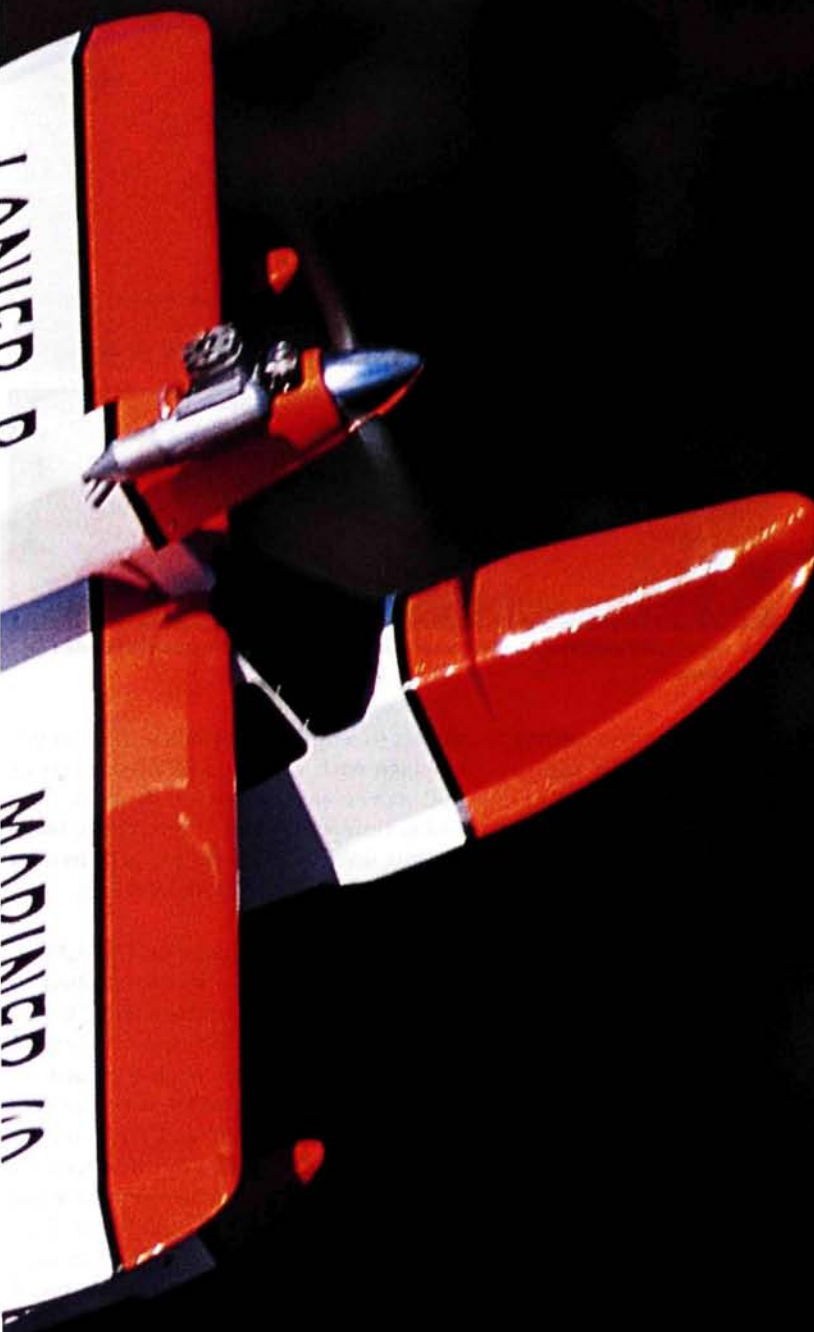
*Make a big splash with this great-flying ARF*

*by Jim Onorato*

One of the RC activities I enjoy most is flying off water, so whenever a new RC seaplane comes along, I'm always eager and ready to try it out. My latest project is a real winner: the Lanier RC Mariner 40 ARF is an almost-ready-to-fly seaplane (or should I say flying boat) that can be assembled in just a few evenings and is designed for a .40 to .50-size 2-stroke engine.







## SPECIFICATIONS

**MODEL:** Mariner 40 ARF

**MANUFACTURER:** Lanier RC

**TYPE:** sport seaplane

**WINGSPAN:** 62 in.

**WING AREA:** 687 sq. in.

**LENGTH:** 48 in.

**WEIGHT:** 6 lb., 4 oz.

**WING LOADING:** 21 oz./sq. ft.

**ENGINE REQ'D:** .40 to .50 2-stroke

**ENGINE USED:** O.S. 46FX 2-stroke

**FUEL:** 10% Red Max

**RADIO REQ'D:** 4-channel w/5 standard servos  
(elevator, rudder, throttle, 2 ailerons)

**RADIO USED:** Futaba 4-channel w/5 148 servos

**PRICE:** \$249

**FEATURES:** built-up balsa and lite-ply ARF covered with iron-on covering, available in three color schemes; fiberglass engine cowl, wingtip floats and fiberglass-reinforced hull; hardware package includes metal clevises, carbon-fiber pushrods, fuel tank and decals.

**COMMENTS:** the Mariner 40 ARF is a well-built flying boat that is a joy to build and fly.

### HITS

- Excellent water handling and flight performance.
- Ease of assembly.
- Completeness of kit.

### MISSES

- Additional support required on rudder and elevator pushrods.





## WHAT'S IN THE BOX

The Mariner is covered with iron-on film and is available in three color schemes: orange and white, yellow and white and red and white. Almost everything is included to complete the kit except the engine, radio, fuel tubing, prop and spinner. The lite-ply and balsa fuselage has a fiberglass-reinforced hull. The stabilizer is built-up balsa stripwood, and the rudder, fin and elevator are sheet balsa. The wing is also built-up balsa with hardwood spars. The fiberglass engine cowl and wingtip floats are painted to match the iron-on film covering. The Mariner uses 4-40-size hardware with metal clevises and carbon-fiber pushrods. A 21-page, photo-illustrated manual is provided to guide you through the assembly process.

## ASSEMBLY

With many ARFs, the first step is to glue the wing panels together, but Lanier recommends that you assemble all of the parts on each wing panel first and then glue them together. I found that this method worked really well, and it was much easier to handle a wing panel while installing the servos than it is to install servos on the whole wing. The Mariner's wing has a constant chord with a thick, symmetrical airfoil and strip ailerons. The slots for the aileron hinges are already cut. I removed the aileron and hinges from the wing, placed a straight pin in the center of each hinge and inserted the hinges into the wing's trailing edge. I then aligned the aileron with the hinges and pushed it on up to the pins. After removing the pins, I pushed on the ailerons and closed the gap even further, then I applied a few drops of thin CA to each hinge.

I cut four pieces of  $\frac{3}{8}$ -inch hardwood and epoxied them to the aileron-servo-hatch covers; then I attached the aileron servos to the hardwood rails on the covers. I attached a 6-inch extension to the servo leads and mounted the covers (with the servos) in the servo openings on the wing panels, securing them with four small screws each. Depending on your brand of servo, you may have to use longer extensions. I connected the servos to the ailerons with the provided wire pushrods and hardware.

The Mariner's included fiberglass tip floats are painted to match the rest of the plane. The floats are nicely shaped with a stepped bottom to improve water handling. They are firmly mounted on the wing using a formed-wire, torsion-type strut similar to the wire landing gear used

on wheeled planes. The floats slide onto the "axle" part of the wire strut using two nylon landing-gear straps to attach the strut to the float's molded vertical strut cover. The wire strut with the float attached is then inserted into slotted hardwood blocks in the wing and attached with two more nylon straps. The end result

is a very simple, good-looking mounting system that holds the floats firmly in place.

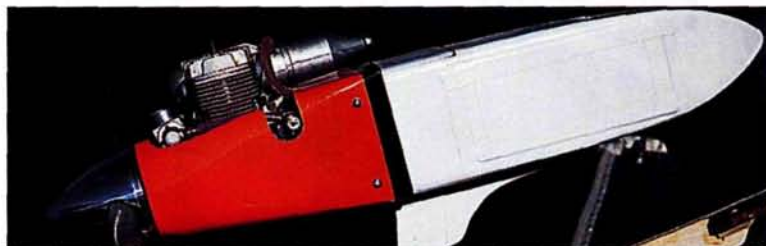
After the ailerons, servos and floats have been attached to each wing panel, I trial-fit the wing joiner between the wing panels. Once I had a nice tight fit, I glued the panels together using 30-minute epoxy. While the epoxy cured, I held the panels together with rubber bands around the leading-edge mounting lugs and around dowels I placed in the wing-bolt holes at the trailing edge.

• **Tail feathers.** I installed the tail feathers by first removing the covering from the areas where the epoxy is applied. Using a generous amount of 5-minute epoxy, I attached the horizontal stab and the vertical and dorsal fins to the fuselage. I installed the control horns with the supplied hardware before I hinged the elevator and rudder to the stab and vertical fin. I aligned the control surfaces and hinges in the same way as I had the ailerons and then applied a few drops of CA to each hinge. The rudder extends below the bottom of the fuselage and is used for steering on the water. I epoxied the triangular sub-fin to the bottom rear of the fuselage and connected it to the rudder with a hinge.

I installed the rudder and elevator servos on  $\frac{3}{8}$ -inch-square hardwood rails that I epoxied into the fuselage. Carbon-fiber pushrods with 4-40-size hardware and metal clevises for the rudder and elevator are supplied. I cut the pushrods and



The Lanier Mariner ARF is a very complete kit that can be assembled quickly.



The engine pod contains the fuel tank and throttle servo. The cowl is molded of fiberglass.

sleeves to length and installed them in the fuselage with cross-braces in the center and at the servo end for support. The instructions call for only one brace, but a second one in the center is required to prevent the pushrods from buckling.

• **Engine pod.** The engine pod is built-up balsa and ply and is already attached to the mast. In addition to the engine, it also holds the fuel tank and throttle servo. I centered the adjustable engine mount on the firewall and attached it with the provided socket-head bolts and blind nuts. I then cut out the opening for the engine in the painted fiberglass cowl and attached the engine to the engine pod with four screws. I made the opening large enough so that I would easily be able to access all the mounting bolts. I assembled the fuel tank, wrapped it in foam and installed it in the rear of the engine pod. The fuel-tank cover fits on the outside of the opening and is held in place with six small screws. Though there is nothing wrong with the supplied cover, I wanted to make everything as waterproof as possible. I made a new one that fits inside the opening and sealed it in place with clear vinyl tape.

I installed a standard-size throttle servo on the mounts on the right side of the engine pod behind the firewall. I used a short piece of music wire with a soldered clevis on the carburetor end and an E/Z connector on the servo end for the throttle linkage. I installed an O.S. 46FX engine on the adjustable mount along with a  $\frac{2}{4}$ -inch



**TAKEOFF AND LANDING**

I fired up the O.S. engine, checked the controls and set the Mariner in the water; its water-handling characteristics were superb! The rudder extends below the waterline and makes steering easy. Taxiing the Mariner away from the boat was



simple, and from a good distance, I pointed it into the slight breeze. I advanced the throttle and watched the Mariner come up on step almost immediately without any elevator input. The generous spray rails and the hull lifters really do the job, and the  $3\frac{1}{2}$  degrees of engine upthrust also helps. Very little aileron control was required to keep the wing level as it made its takeoff run. The plane accelerated quickly and was airborne before I knew it. The O.S. 46FX engine provided plenty of power. Watching the water stream off the fuselage after liftoff is one of the coolest aspects of flying off the water.

Water landings are much like those on land, except that you don't want to land at a full-flare stall. Water landings are best

made at a little faster speed than you would normally use when landing on land. This not only allows the plane to skim along after touchdown but also makes it easier to accelerate and keep flying if the plane takes a high bounce on landing. The Mariner has a very gentle glide slope and is easy to land. On a long approach with a bit of throttle and with the plane level, the landing will always be perfect. After touchdown, I pull the throttle back to idle and let the plane slow down on its own—unless, of course, I'm doing my favorite thing—a touch-and-go (or more appropriately, "a splash and dash").

**GENERAL FLIGHT PERFORMANCE**

The O.S. 46FX is a good match for the Mariner. It provides sufficient power for relatively fast flying and a reliable idle to let the plane fly slowly and realistically. The huge, constant-chord, symmetrical wing gives the Mariner great stability. The plane is responsive to controls at all speeds and doesn't exhibit any bad tendencies in the air. It tracked well and flew smoothly at all speeds.

**AEROBATICS**

The fully symmetrical wing allows the Mariner to perform most of the maneuvers the average Sunday flier would want from a plane. It does rolls, loops, spins, snaps and many combinations of these. Because it doesn't have floats that would give it a "pendulum" effect, it flies inverted with the ease of a land-based plane. Flying off water is great fun, especially with a plane that performs as well as this one!

Tru-Turn aluminum spinner and an 11x7 APC prop. I sealed the throttle-servo cover in place with clear vinyl tape. I then epoxied the completed engine pod/mast assembly into the fuselage with 30-minute epoxy.

- **Fuselage.** The fuselage is made of lite-ply and balsa with a fiberglass-reinforced hull and requires almost no work to complete. The fiberglass bottom has iron-on covering, that unfortunately does not stick well to the fiberglass. Make sure that the edge of the covering is ironed down well so it doesn't come loose. As an added measure, I also applied some thin CA along the

edges. The bottom of the hull is easily scraped, so it is a good idea to check the covering after each flying session. The Mariner's hull has generous spray rails to help keep water spray away from the prop. It also has hull lifters attached to it to help break the vacuum that sometimes occurs at the step during takeoff. I removed the covering from the area where the lifters would go and glued them into place with 5-minute epoxy, making sure I had a good fillet of epoxy all around the edges. The last assembly step is to install the formed-plastic windshield. I trimmed the windshield and attached it with six small screws. It isn't necessary to seal the windshield's edges because the fuselage design is such that even if any water gets under the windshield, it cannot enter the fuselage.

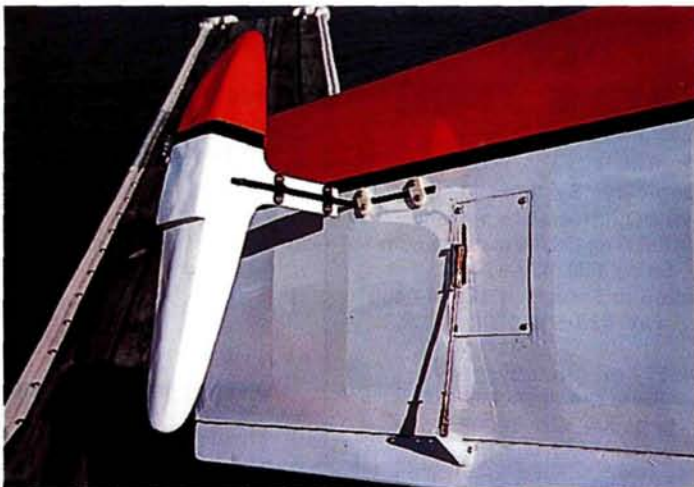
I wrapped the receiver and battery in plastic bags and then installed the receiver in front of the servos and the battery as far forward in the nose as it would go. I routed the receiver antenna through a plastic

tube inside the fuselage and installed the receiver switch inside the fuselage using a Du-Bro Kwik-Switch and Charging Jack No. 207. I then sealed the joint between the wing and the fuselage with silicone sealant and attached the wing.

The Mariner is inherently tail-heavy, and I had to add some weight (about 5 ounces) in the forward hatch compartment along with the receiver battery. After I balanced the model, I sealed the forward hatch with clear vinyl tape to make it waterproof. The finishing touch was adding the decals.

**CONCLUSION**

The Mariner 40 is a well-made ARF that is not only extremely easy to assemble but also looks and flies great. If you've wanted to try flying off water but didn't have time to build a kit, you might want to try this one. Lanier has done most of the work for you, and I'm sure you'll like it! ✈



The tip floats are fiberglass and are torsion mounted, much like a wheeled landing gear on a land plane.

**APC Props;** distributed by Landing Products (530) 661-0399; [apcprop.com](http://apcprop.com).

**Du-Bro Products** (800) 848-9411; [dubro.com](http://dubro.com).

**Futaba Corp. of America;** distributed by Great Planes; [futaba-rc.com](http://futaba-rc.com).

**Great Planes Model Distributors Co.** (800) 637-7660; [greatplanes.com](http://greatplanes.com).

**O.S.;** distributed by Great Planes; [osengines.com](http://osengines.com).

**Red Max;** a division of FHS Supply Inc. (800) 742-8484; [members.aol.com/FHSoil/RedMax.html](http://members.aol.com/FHSoil/RedMax.html).

**Tru-Turn;** distributed by Romco Mfg. (713) 943-1867; [tru-turn.com](http://tru-turn.com).



OK MODELS

# SEDUCTION FUN FLY

*Quick build  
equals fast fun*

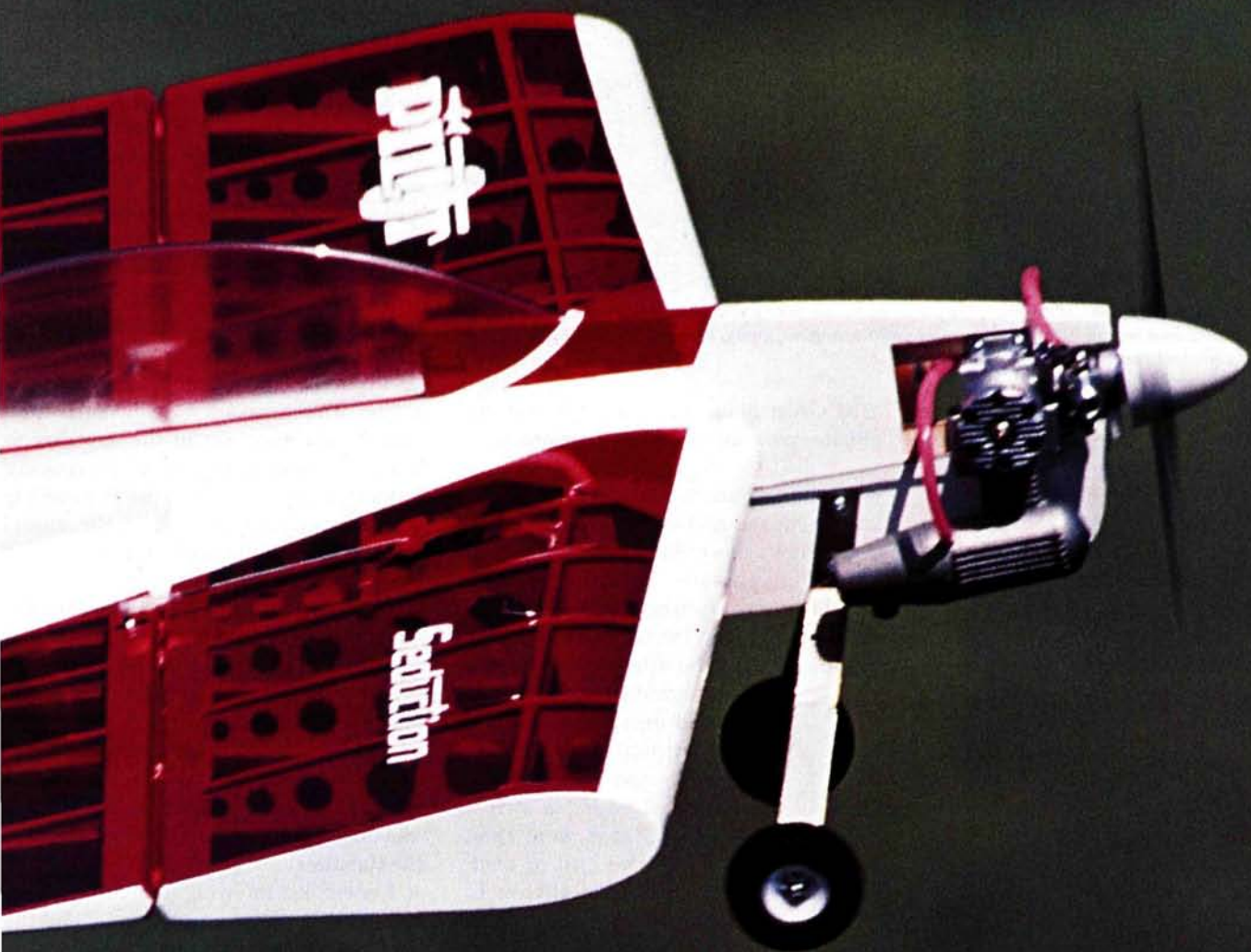


*The white MonoKote on the fuselage and leading edge of the wing shows up nicely during flight.*

One of the latest crazes in RC is the fun-fly, 3D-type airplane. With their excellent flight characteristics, fun-fly models appeal to a wide range of pilots. For the novice, this type of model is very stable with gentle stall characteristics. For the experienced pilot who is looking for a model that can rock and roll, fun-fly models can perform virtually any maneuver you can think of—and then some. With its thick airfoil, generous wing area and huge control surfaces, the new OK Models Seduction almost-ready-to-cover (ARC) Fun-Fly can meet the needs of just about any pilot.

*by Erick Royer*





## SPECIFICATIONS

**MODEL:** Seduction Fun-Fly

**MANUFACTURER:** OK Models Ltd.

**DISTRIBUTOR:** MRC/Altech

**TYPE:** almost-ready-to-cover fun-fly

**WINGSPAN:** 46.5 in.

**LENGTH:** 46.5 in.

**WEIGHT:** 3 lb. 7 oz.

**WING AREA:** 617 sq. in.

**WING LOADING:** 13.7 oz./sq. ft.

**RADIO REQ'D:** 4-channel with 5 servos  
(computer radio required for advanced  
aerobatic maneuvers)

**RADIO SYSTEM USED:** Hitec Eclipse, 5 Hitec  
425BB servos

**ENGINE REQ'D:** .30 to .45 2-stroke or .40 to  
.50 4-stroke

**ENGINE USED:** Enya 40 SS 2-stroke

**PROP USED:** APC 11x4

**FUEL USED:** Wildcat 15%

**PRICE:** \$180

**FEATURES:** fully built wing, fuselage and  
tail components; canopy, plastic hatch covers,  
control horns and clevises; aluminum  
landing gear, wheels and miscellaneous  
hardware.

**COMMENTS:** the Seduction is a fast-building,  
ARC fun-fly type of model. The construction is

first rate, and the plane looks fantastic  
when covered with a transparent covering.  
The best thing about the Seduction is the  
way it flies. It's well suited to novices who  
are just learning aerobatics or for advanced  
pilots who want to expand their aerobatic  
repertoires.

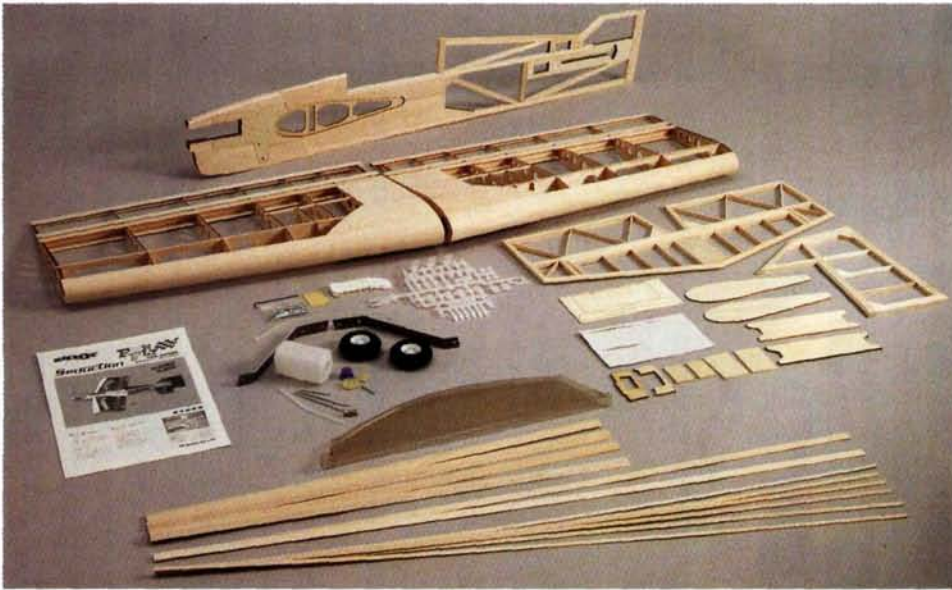
### HITS

- Excellent construction.
- Fast assembly.
- Very aerobatic.

### MISSES

- No decals provided.
- No pushrod material.





**The Seduction as it comes out of the box. The major parts are made of laser-cut balsa and plywood. It's very well built, and you need only add a radio system, engine, glues, covering material and pushrods to complete the model.**

### KIT CONTENTS

The construction quality is outstanding: the wing halves, fuselage and control surfaces are constructed of high-grade, laser-cut balsa and plywood. Since this is an ARC model, I immediately started to think about the covering material and trim scheme that I would use. My first thought was to use opaque colors, but I realized that it would be a shame to cover



**There are cutouts in the rear of the fuselage for the rudder and elevator servos. I took advantage of this by installing the elevator servo to help balance the model.**

up the model's beautiful construction, so I decided to use MonoKote transparent red and add solid white for contrast. I wasn't disappointed with the results!

### CONSTRUCTION NOTES

All of the model's major parts are built, so it required only minor assembly to be ready for the radio equipment and engine installation. The airframe needed very little sanding to make it ready for covering. I

used Great Planes medium CA and 30-minute epoxy for the model's construction.

• **Wing assembly.** It took only a few minutes to cut the ailerons and elevators free from their respective structures and to sand them smooth. To form a double bevel for maximum control-surface deflection, I glued triangular stock to the leading edge of the ailerons and to the wing's trailing edge. Next, I applied capstrips to the top and bottom of the ribs on the wing and ailerons using the supplied balsa strips. Balsa end caps were then glued to the end of each wing panel and aileron to make the wingtips.

I cut openings in the top and bottom of the wing sheeting for access to the radio compartment for the rudder and throttle servos. The instructions show the appropriate locations, but cutout dimensions aren't given. Laser-cut plywood servo trays are supplied, but the servo openings are sized for miniservos. Because I used Hitec 425BB standard-size servos, I slightly enlarged the openings to accommodate them; a scribe line on the servo tray indicates where to cut to make room for the standard servos. If you do use standard-size servos, it will be a lot easier if you fit them before you install the trays in the radio compartment.

• **Covering and radio system.** At this point in the construction, you can assemble the

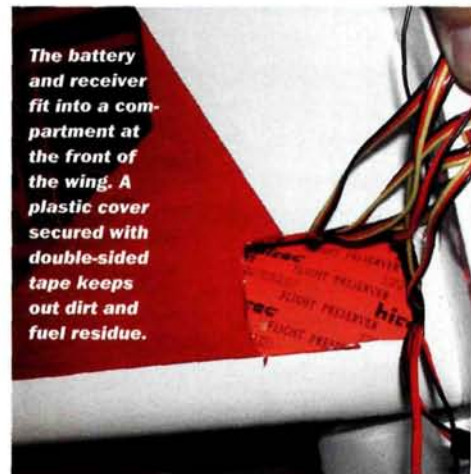
model and cover it, or cover the components and then assemble it as you would an ARF. I chose the latter because it's much easier to cover the parts first and then glue them together.

Before applying the covering, I lightly sanded the model with 220-grit sandpaper and wiped it with a tack rag to remove sanding dust. I covered my Seduction so it resembled the one shown on the box. I applied MonoKote transparent red first and followed it with white. I was disappointed that decals weren't included in the kit. At the OK Models website ([okmodel.co.jp/DL-sticker.htm](http://okmodel.co.jp/DL-sticker.htm)), you can download the decal images for the model and print them out to use as stencils.

The instructions have you install the servos in the wing after the model has been covered and assembled. I found it easier to install the servos for each aileron and the rudder and throttle after the wings had been covered but before I assembled the model. The downside to this is that you have to cut openings in the covering to mount the servos; this leaves unattractive holes that you will have to patch. Installing the servos before you cover the model would eliminate the need for patching and would make it look nicer.

I slid the horizontal stabilizer into the fuselage, centered it, and marked where to remove the covering from the stabilizer before gluing it into place. I used a Top Flite Woodpecker tool on the gluing area of the stabilizer to make a series of small holes to give the epoxy extra bite for a more secure bond. The one-piece elevator must be slid into place before you glue in the stabilizer.

I assembled the wing joiner brace from the supplied balsa and plywood. I slid the brace into a wing panel and used 30-minute epoxy to secure it to the fuselage. Be sure to remove excess epoxy, or the other wing panel will not fit properly. When the epoxy had cured, I repeated the process and



**The battery and receiver fit into a compartment at the front of the wing. A plastic cover secured with double-sided tape keeps out dirt and fuel residue.**



### TAKEOFF AND LANDING

The combination of light wing loading and a thick, fully symmetrical wing makes the Seduction a dream to take off and land. Despite the lack of a tailwheel, ground handling isn't a problem. After slowly throttling up, the Seduction is airborne in less than 40 feet, and very little rudder input is required for arrow-straight takeoffs. Climb-outs are graceful and uneventful. Because this is a fun-fly-type airplane, scale-like takeoffs are not the norm for me, so as soon as the plane breaks ground, I apply full throttle and a handful of up-elevator and watch the Seduction climb almost like a rocket. Outrageous fun!

Landings are equally easy; the thick wing allows the plane to float for what seems to be forever. In some cases, I have to fight to get it down; it just wants to keep flying.

### LOW-SPEED PERFORMANCE

Slow-speed flight can be as slow as a walking pace with almost no forward momentum. Even at this ground speed, all control surfaces remain effective; their large surface areas really pay off here. To make the model stall, I really have to work hard, and when it does stall, the nose drops gently; a few clicks of power get it flying again.

### HIGH-SPEED PERFORMANCE

When the plane is at full throttle, I would not call it fast, but it does move along at a pretty good clip. I didn't notice any trim changes when it transitions from low-speed to high-speed flight. The Enya 40 does a good job of pulling this plane around with authority.

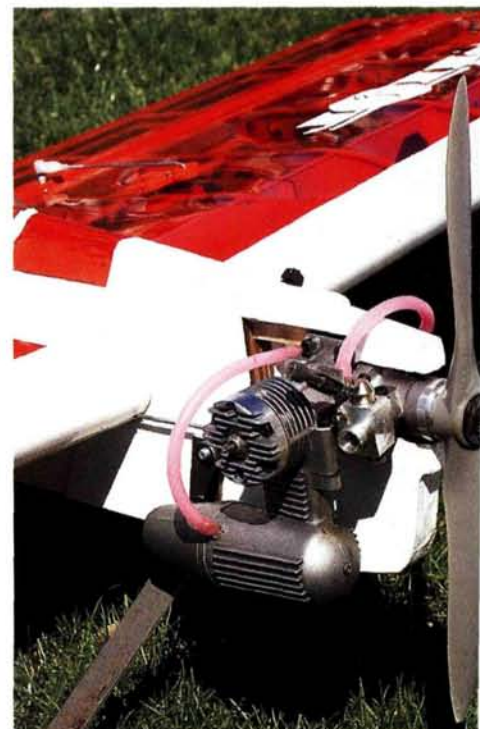
### AEROBATICS

Aerobatics are what the Seduction was made for! Loops are as large or as small as you want. With maximum elevator throw, the plane pretty much rotates around its center of gravity (CG). Rolls are very fast and axial, and slow rolls can be performed with one revolution that lasts the length of the runway. In knife-edge flight, there is some roll coupling that requires the use of aileron and elevator to keep the wing perpendicular and on track. This can be easily trimmed out with a computer radio. The Seduction performs some of the best flat spins I've ever seen, and it seems to take forever to lose any altitude.

I tried 3D aerobatics that included Harriers, the Wall and hovering. During Harriers, there is a lot of wing rocking, but that is common with aircraft of this size. I mixed in spoilers (both ailerons up about 10 degrees), and the rocking all but disappeared. Performing Walls with the Seduction is really neat; as I fly it to the center of the runway and apply full up-elevator, the plane instantly transitions into vertical flight. Though the plane can hover with the Enya 40, it doesn't have quite enough power to climb out of a hover. A larger engine would be a better choice for hovering-type maneuvers.



The wing panels fit into recesses in the profile fuselage. A laminated balsa and ply brace ties them together.



Engine installation is as simple as it gets. I needed only to slightly enlarge the cutout to fit the Enya .40 SS engine.

attached the other wing panel while guiding the servo leads into the radio compartment.

• **Final assembly.** When the wing and stabilizer were secured, I used my Great Planes Slot Machine to cut the slots for the CA hinges. I positioned the slots as indicated in the instructions, and hinged the control surfaces with a few drops of thin CA and installed the control horns. The kit does not include pushrod material, so I used 2-56 metal rods and the supplied plastic clevises to hook up the ailerons and elevator, and I used a Sullivan Precision Rod for the rudder. Be sure to install a piece of fuel tubing over the clevises to ensure that they don't pop open when in flight.

It was easy to install the engine; I used an Enya .40 SS that fit nicely into the cutout

on the fuselage after minor sanding with a Dremel tool. I mounted the engine with four 6-32 bolts and blind nuts, and I poked another 2-56 pushrod through the leading edge of the wing for the throttle linkage.

I wrapped the receiver and battery in foam and then I put them in the radio compartment, and installed the switch in the top of the wing opposite the muffler, covered the compartment with the supplied plastic cover and secured it with double-sided tape. I installed the landing gear and wheels with the included hardware. As a final step, I trimmed the canopy and secured it to the fuselage with Pacer Canopy Glue.

### CONCLUSION

The OK Models Seduction is a very well-constructed fun-fly kit. I was impressed

with its aerobatic ability and well-mannered flight characteristics; its compact size makes it easy to transport. If you're looking for a plane that's an excellent Sunday flyer and can do exciting aerobatics, the Seduction is for you! ✈

*APC Props*; distributed by Landing Products (530) 661-0388; [apcprop.com](http://apcprop.com).

*Enya*; distributed by Altech Marketing.

*Great Planes Model Distributors Co.* (800) 637-7660; [greatplanes.com](http://greatplanes.com).

*MonoKote*; distributed by Great Planes.

*MRC/Altech* (732) 225-6144; [modelrectifier.com](http://modelrectifier.com).

*OK Models*; distributed by MRC/Altech.

*Pacer Technology* (800) 538-3091; [pacertechnology.com](http://pacertechnology.com).

*Sullivan Products* (410) 732-3500; [sullivanproducts.com](http://sullivanproducts.com).

*Top Flite*; distributed by Great Planes; [top-flite.com](http://top-flite.com).







*Editor's note: the A-10 shown was specially painted.*

*by Dave Robelen*

PHOTOS BY JOHN REID



**T**he latest electric model from GWS is the A-10 Warthog ARF park flyer. With fine scale looks and great performance, the all-foam, molded A-10 is powered by twin GWS EDF 50 ducted-fan units and is available painted gray or unpainted, and it includes decals to add to its already scale military looks. GWS planes are distributed exclusively by Horizon Hobby.

# GWS A-10 ARF

*Mission: secure the park with this twin electric jet*



**OUT OF THE BOX**

Right from the start, I was impressed. The foam parts were beautifully made, and there were ample small parts on plastic trees for all of the accessories. The instruction booklet is perfectly clear and contains precise, step-by-step photographs. On the painted model, the light coat of gray looked true to the original aircraft's and was very uniform—nice job!

**ON THE BENCH**

Following the instructions, I assembled the nose gear and attached it to the left fuselage shell using the contact cement that is included in the kit. There aren't any instructions for using it, and this could lead to some very long drying times if you try to use it like reg-

ular glue. Before you join the surfaces to be glued, apply a thin coat of this cement and allow it to dry until it's tacky. There is one assembly step, however, in which gluing should be done a little differently. Since there's a closely fitting recess in the nacelle and it fits on molded stubs, you won't be able to slide the nacelle into place if you allow the glue to get too tacky. Don't let the glue dry too much before you join the parts.

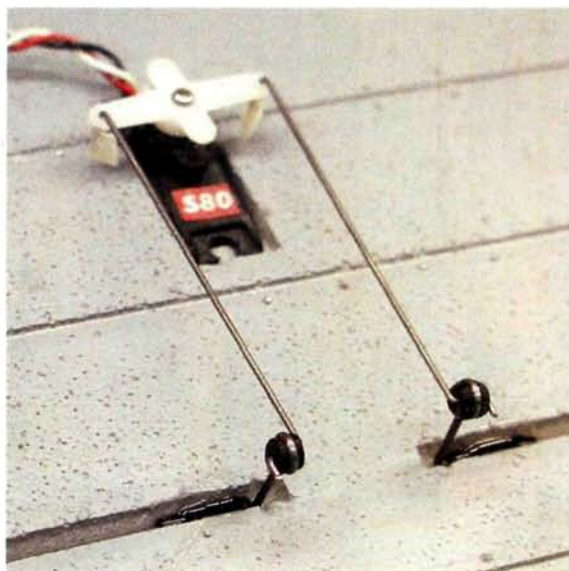
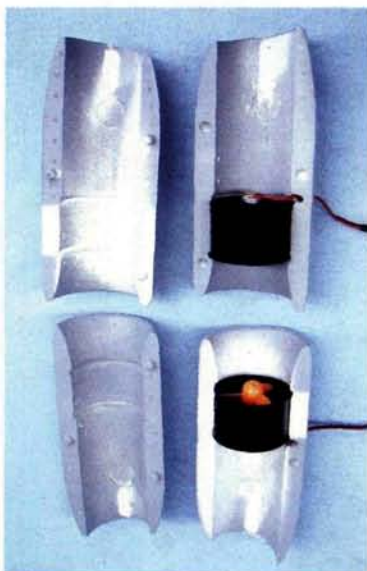
I used 5-minute epoxy to join the hard plastic parts and the foam. After you've installed the nose-gear system on the left side of the fuselage and you've pulled through half of the Y-cable for the fans, join the sides, and make sure that you pull the other half of the cable through the right

side. This is important, since there is no way to reach this wiring from the inside once the sides have been joined. The kit includes a batch of rubber bands that are perfect for clamping the fuselage sides together while the glue dries. The bands were a valuable addition, since taping the sides together would have lifted the paint off the foam.

The fans and nacelles are assembled much like the fuselage is (allow the cement to dry partway before you join the pieces). The one-piece wing and torque-rod aileron linkage installation is next. This linkage includes a very clever step in which rubber grommets are pressed into loops in the rods to ensure a perfect fit for the pushrods. Cut the ailerons free with a very sharp blade, and carefully



The A-10 comes with all of these molded parts, two EDF 50 fan units and propellers, hardware, landing gear, contact cement and decals. The instruction booklet is very thorough and informative.



Left: the A-10 was designed around the supplied EDF 50 fan unit. Each unit fits inside a molded foam nacelle that is then glued to the fuselage—an easy installation! Right: the aileron servo fits inside a molded pocket, and the pushrods fit a groove in the wing and are then covered with gray decal strips.

**SPECIFICATIONS**

**MODEL:** A-10 ARF

**TYPE:** twin, electric park flyer

**MANUFACTURER:** GWS

**DISTRIBUTOR:** Horizon Hobby

**WINGSPAN:** 38 in.

**WING AREA:** 219 sq. in.

**WING LOADING:** 11.1 oz./sq. ft.

**LENGTH:** 34.3 in.

**WEIGHT:** 16.9 oz.

**POWER SYSTEM:** two GWS EDF 50 fan units (included with props)

**RADIO REQ'D:** 4-channel (throttle, elevator, aileron, nose-gear steering)

**RADIO USED:** Hitec Spectra 7 transmitter, GWS Pico servos, GWS R4P receiver, Jeti 10A ESC.

**BATTERY USED:** 6-cell, 500AR Ni-Cd pack

**FLIGHT DURATION:** 5 to 7 min.

**PRICE:** \$64.99 (unpainted); \$79.99 (gray)

**FEATURES:** comes with molded-foam parts, two EDF 50 ducted-fan units and propellers, contact cement, decals and all the needed hardware, including landing gear and a steerable nosewheel; available unpainted and in gray.

**COMMENTS:** the GWS A-10 is a very nicely done kit with high-quality foam molding and accessories. It will take you between 8 and 16 hours to assemble, depending on your expertise.

**HITS**

- High-quality, well-made parts.
- Excellent instruction booklet.
- Realistic flight characteristics and great handling.

**MISSES**

- None.





PHOTO BY RICK LUNARES

# A-10 Flying Artillery

**T**he A-10 isn't an airplane; it's a terrifyingly effective ball-peen hammer that's designed to do one job and one job only: support the guys on the ground. At the beginning, that meant it was to blunt the tank attacks that Cold War planners knew the Russians would send rolling across Europe in waves. At the end, that meant the Warthog would be called on to eliminate anything on the ground that the Army wanted removed from its path.

In reality, the A-10 is a cannon: a 20-foot-long, 4,000-pound, multi-barrel, 30mm Gatling gun with wings. It's a rudimentary delivery truck that can hose a target with 3,900 rounds of ammunition a second while carrying 16,000 pounds of bombs—several times the bomb load of a B-17—under its Hershey-bar wings. The cannon shells laugh at armor plate, and the bombs—all delivered low and slow—always go right down the target's throat.

Today, the A-10, formally known as the Thunderbolt II, is the darling of the battlefield, but it wasn't always so; in fact, if Saddam had kept his mouth shut and his head down, the A-10 would have been totally retired in 1992.

The Air Force adapted the airplane, much against the wishes of a huge number of commanders who thought only in terms of high and fast. What, they asked, was the mighty Air Force doing with a 450-knot, hyper-ugly, ungainly toad that was designed to get low, stay low and, like its WW II namesake, the Thunderbolt, always bring its pilots home? The military was in love with fast movers and accepted the A-10 only under immense pressure from forces outside its own command structure.

When the threat in Europe evaporated, the Hog was doomed, and its retirement papers were drawn up. It was official: it would be eliminated and, thankfully, hidden from sight by 1992. Then Saddam

decided to be a bad boy, and the A-10 was back in business. The situation in Iraq has proven repeatedly that the original concepts of the airplane were not only sound but also much needed.

The A-10 is rudimentary for a lot of good reasons. A weapon is only of value if it can survive the battlefield and be easily maintained. It has been said that a .22 bullet can bring down most jets because of their complexity and the density of their systems. Not so the A-10. Its systems are few, extremely simple and widely spaced; they also have mechanical backups. Its engines and pilot are wrapped in titanium armor and, from the drawing board, it was designed to come home with half of one wing missing.

The Warthog is not fast for a lot of good reasons. In battle, accuracy reigns, and speed works against accuracy. Being able to get right in the bad guy's face without his hearing you coming and with enough hang-time to make certain every bullet and every bomb counts means you don't have to go back a second time ... and the bad guy doesn't get a second chance.

The good guys on the ground love the Hog. The bad guys hate it. And by the way—now, even the Air Force loves it. Nothing like a couple of wars to prove the effectiveness of a weapon, is there? Current plans are to keep it on board until at least 2028. So any dictator or foreign government official who has the urge to thumb his nose at freedom had better be careful: the Warthog is watching.

—Budd Davisson

*Editor's note: our resident full-scale-airplane expert, Budd Davisson is editor-in-chief of our sister publication, Flight Journal. Budd has logged more than 6,000 hours in nearly 300 types of planes, including many aerobats and WW II fighters.*



## FLIGHT PERFORMANCE

### TAKEOFF AND LANDING

With a fresh charge on the 6-cell Ni-Cd pack and the range check completed, I headed for my paved strip. Right from the start, this was a different experience! The fans really howled, and the takeoff run was quite reasonable at 50 feet. You'll need a very smooth strip for takeoff and landing; hand-launching by yourself is difficult because of the wing's position.

On landing, it's best to keep a bit of power on during the approach; the A-10 is not a glider! Unless the touchdown on a hard surface is nose-high (like the space shuttle), the rigid nose-gear strut may cause the model to rebound. It would be a good idea to add a shock coil to this nose-gear system.

### GENERAL FLIGHT CHARACTERISTICS

The A-10 climbs smoothly and can reach 150 feet within a few laps around my small field. Its flight qualities are very—well-harmonized controls and excellent stall characteristics. The A-10 is mildly aerobatic on 6 cells, and its flying speed is fairly fast. Get it higher for maneuvers, as it will tend to lose altitude. After a slight dive to gain speed, loops are easy, as are right and left rolls.

sand away the excess molding. The hinge material is a very thin, soft plastic, and I found it quite difficult to slide it into the grooves after I had coated it with cement, so I substituted thin plastic hinges. After you've installed the linkages, press a gray decal strip over the groove to make a smooth surface. A bamboo rod reinforces the lower surface and is also covered with a decal.

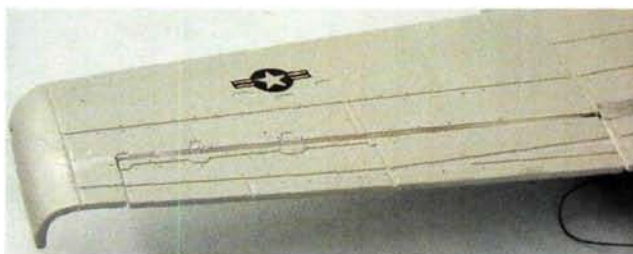
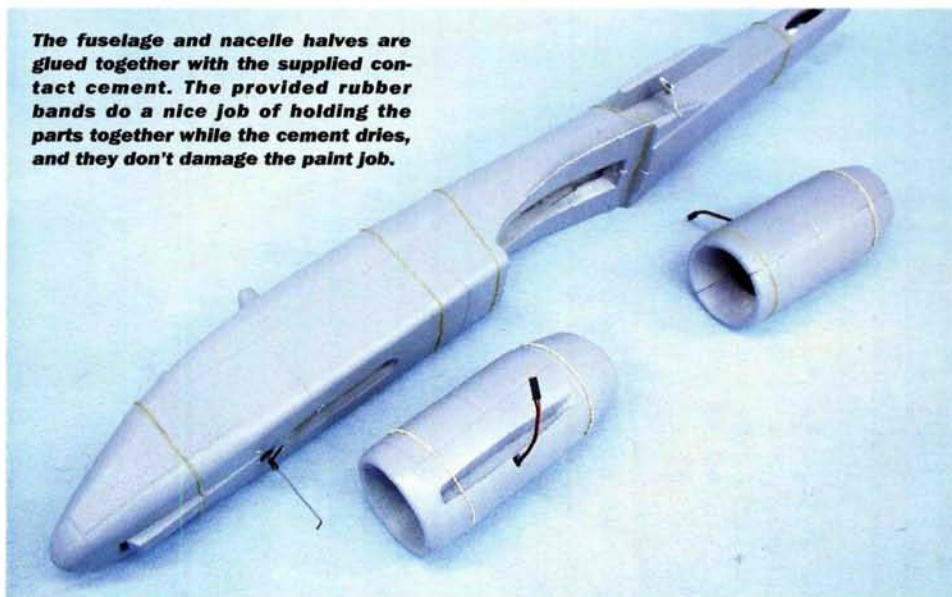
The wing-mounting system is cleverly made up of some molded-plastic parts that are glued into place and result in a neatly fitting bolt-on wing. The fuselage has precision-molded fillets that mate with the wing. These fillets are very delicate at their edges; handle this assembly carefully.

Cut the elevators free of the stabilizer, and smooth the hinge area with a sanding block. The instructions on installing the stabilizer, hinging the elevators and mounting the fins are quite clear. Now it's time to add the engine pods. The model is beginning to look like an A-10!

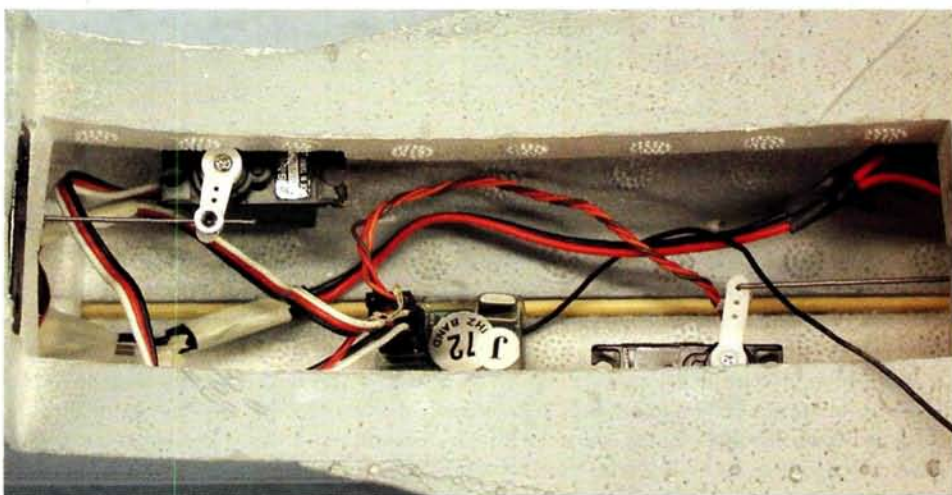
### EQUIPMENT AND INSTALLATION

Radio and motor installation are covered very well in the instructions. The servos are attached to the foam with the provided double-sided tape, and the linkages are made out of the provided 1mm wire, which is stiff enough and works smoothly. The battery is inserted in an opening in the fuselage bottom and mounted forward in the A-10's long nose. Though it seems inclined to stay in place during flight, a healthy bounce on landing will often put a battery on the run-

*The fuselage and nacelle halves are glued together with the supplied contact cement. The provided rubber bands do a nice job of holding the parts together while the cement dries, and they don't damage the paint job.*



*Left: these scale details are molded into the foam, and the provided decals add a nice touch—very well done! Below: plenty of room for the radio gear in here! GWS provided double-sided tape to stick the servos to the fuselage sides. The wooden dowel in the center provides rigidity and strength.*



way. To avoid this, I packed the battery in stiff foam. Another issue that came up with the battery's being so far forward was the length of the wiring required; my ESC wires didn't reach the battery. I used a heavy-gauge wire to extend the wires.

The instructions recommend that you use a 400mAh Ni-Cd or a 730mAh NiMH battery pack, but because the operating current reached 8 amps and higher, I used a 6-cell, 500AR Ni-Cd pack. As it turned out, the slight extra battery weight was needed to balance the model as recommended. The kit includes a stick of modeling clay for balancing, but I'd much rather put my ballast to work!

The installation of the landing gear, the press-on decals and the canopy finished the bench work, but those bicycle wheels look

awfully silly on a jet! The instructions give excellent information on the control throws and tips on flying the A-10.

### FINAL THOUGHTS

The GWS A-10 kit is well thought out, and it's a very good value. It has especially nice molding work, and the instruction booklet is very clear and helpful. The A-10 flies realistically with outstanding handling. If you already have some stick time on a fast, maneuverable model with aileron control, the A-10 is a great choice for you. ✚

GWS; distributed by Horizon Hobby.  
Hitec RCD Inc. (858) 748-6948; hitecrd.com.  
Horizon Hobby Inc. (800) 338-4639;  
horizonhobby.com.











Dave Patrick Models

# Ultimate 40 ARF

by Gerry Yarrish

## *A small biplane with a big aerobatic heart!*

I have always loved biplanes, and one of my all-time favorites is the Ultimate Bipe. Designed by the unlimited-aerobatics pilot Gordon Price, the original, full-size aircraft has been very popular ever since it first came out. Most recently, Tournament of Champions winner Chip Hyde flew a very impressive 40-percent-scale Ultimate Bipe and became the 2002 champ at the Las Vegas competition.

Dave Patrick Models introduced the Ultimate Bipe in an impressive 1.20 size and, with it, set a very high standard for ARF quality and performance (see my review in the August 2001 issue). When I saw the .40-size Ultimate Bipe, I thought it would be a great counterpoint to the larger model; not everyone wants to tote around a big 1.20 biplane.

Just like its bigger brother, the Ultimate 40 is available in a red/orange/yellow/white color scheme, a blue scheme, as a white ARF and in an almost-ready-to-cover (ARC) version. It comes with the same high-quality hardware and an excellent instruction booklet, making assembly as simple as 1, 2, 3.



PHOTOS BY DERON NEBLETT



## ASSEMBLY

The Ultimate 40 is covered with Ultracote that is beautifully applied, but before I put the pieces together, I used a heat gun to remove the few wrinkles that always seem to pop up on ARF models. The instruction booklet provides photo-illustrated assembly steps and even some "builder tips" for basic building tasks—a nice touch.

• **Fuselage.** The model comes with the engine cowl, cabane struts and the canopy already installed, so there is little to do to get the fuselage ready for wing installation. Basically, just install the tail surfaces and the tailwheel. I used Zap medium CA glue throughout. The instructions recommend that you first install the control hinges and then the horns; I like to install the horns first and then attach the

control surfaces. This way, it's a lot easier to drill the holes straight through the surfaces so the horn backup plates line up with the horn-attachment screws.

Before you can install the control cables, you must cut slots at the correct locations in the fuselage sides. The instructions show how you can use the cables to lay out the slot locations, and this works very well. Measure the distance from the servo arms to the wing-saddle opening and mark the side of the fuselage. Attach the cable to the control horn, and stretch the cable to the

surface is centered, lock the cable into place with a few drops of thin CA. For a finished look, you can slip some heat-shrink tubing over the cable and coupler joint.

After several flights, I found this control system to be very secure and virtually slop-free.

When the servos and control linkage have been installed, it's time to install the landing gear, wheels and wheel pants. A nice touch here is that the pants come ready to be screwed into place. Each pant is already slotted to clear the axle bolts, and the internal plywood doubler plate is already glued into place.

*Below: the Ultimate 40 is a complete ARF kit. The wings come in one piece, and the engine cowl and canopy are already screwed into place. Bottom left: I used an Enya .50SS to power my Ultimate 40. It has more than enough power for this little biplane, and it fits nicely in the engine cowl. Note that it is canted slightly counterclockwise. Bottom center: the interplane struts also come completely covered and ready to install. Note the aluminum attachment fitting that's screwed into the wing. Bottom right: instead of installing a three-line fuel system, I used a Du-Bro fuel fitting. I made the plywood attachment bracket, so the fitting lines up with an opening in the cowl.*

## SPECIFICATIONS

**MODEL:** Ultimate 40

**TYPE:** sport-scale biplane ARF

**MANUFACTURER:** Dave Patrick Models

**WINGSPAN:** 43.5 in.

**WING AREA:** 630 sq. in.

**WEIGHT:** 5 lb., 8 oz.

**WING LOADING:** 20.11 oz./sq. ft.

**ENGINE REQ'D:** .40 to .45 2-stroke or .52 to .63 4-stroke

**ENGINE USED:** Enya .50SS

**RADIO REQ'D:** 4-channel (rudder, 2 ailerons, throttle, elevator)

**RADIO USED:** JR 8103 with 537 servos (Digital DS3421 miniservos for ailerons)

**PROP USED:** 11x7 APC

**FUEL USED:** Wildcat 15%

**PRICE:** \$249.99 (ARF); \$224.99 (ARC)

**FEATURES:** the kit comes with fully covered one-piece wings, fuselage and tail surfaces; complete hardware package; includes tail-wheel assembly, fuel tank and tank hardware, plastic spinner, engine mount and attachment bolts, pull/pull control cable and linkage for elevator and rudder, pushrods for throttle and ailerons and painted fiberglass cowl and wheel pants. The canopy comes installed, and decals are also included.

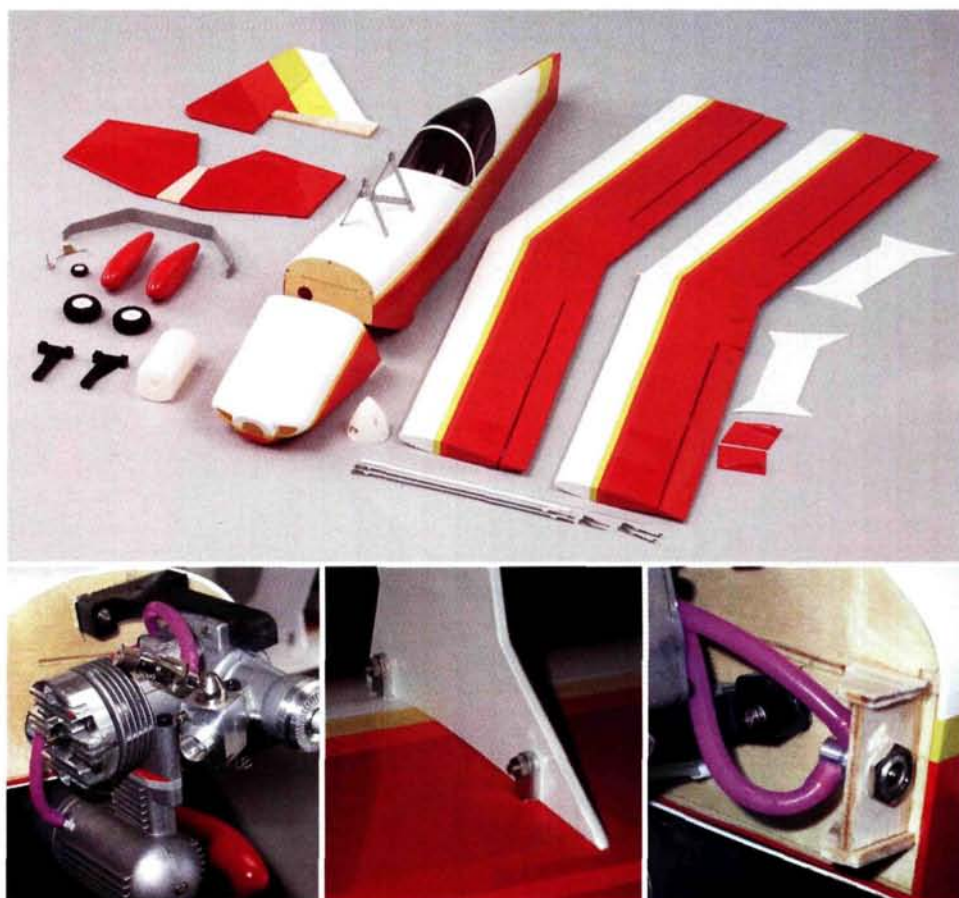
**COMMENTS:** like its 1.20-size big brother, the .40-size Ultimate is a high-performance biplane with excellent flight characteristics. It is very easy to assemble and requires only about 10 hours to complete.

## HITS

- Fast and easy assembly.
- Great instructions.
- Pull/pull rudder and elevator-control system.
- Painted fiberglass cowl and wheel pants.
- Excellent flight performance.

## MISSSES

- Some very minor wrinkles in covering.



servo-arm location mark. Mark the location of the cable just below the stabilizer leading edge, and then cut a  $\frac{1}{16} \times \frac{3}{8}$ -inch slot. Do this for the rest of the cables to finish the control-linkage setup.

The pull/pull hardware for the rudder and the elevators comes with the kit, and it's very easy to install. The threaded couplers that connect the cables to the clevises have cross-drilled holes; simply thread the cable into the coupler and out through one of the holes, loop it around and back into the other hole, and then pull it back out of the coupler. When the cables are taut and the control

• **Wing assembly.** Since the wings come in one piece (no gluing halves together), this involves only installing the aileron servos and the interplane strut fittings. The kit comes with removable plastic panels that serve as servo mounts to which you attach the servos. Hardwood servo-attachment blocks are glued to the hatch covers that are secured with screws for extra security. Four small screws then secure the hatches over the servo openings in the wing panels. Strings are provided (already installed) in the panels to help feed the servo leads through the ribs to the center of the wing panels.





I pushed the throttle, and the model tracked quickly down the runway. Hardly any rudder correction was needed to keep it on the runway's centerline. Just as I hit full power, the model lifted off and headed toward the clouds. My initial trim settings were very close, and only a few clicks of down-elevator and a little right aileron were needed for hands-off, straight-and-level flight. Without question, the Enya .50SS provides more than enough power for this model; any good .40 to .46 2-stroke will do the job just fine.

#### LANDING

Like any high-performance biplane, this model reacts best with a little power held in during the entire final approach. Keep the nose down slightly and begin to flare after the model reaches the runway threshold. The

I inspected the entire model one last time and then headed to the flying field. I had run about five tanks of fuel through the Enya .50SS a few days earlier, so it didn't require much needle adjustment to get the model in the air!

#### TAKEOFF

I checked the controls once more and taxied the Ultimate out of the pit area.

Ultimate 40 has fairly thin wings, so it glides (penetrates) better than you might expect. Even so, control the descent rate with small throttle adjustments, and fly it all the way to the ground. Once you've flared the model into a 3-point attitude, it slows down nicely and rolls out without wanting to swap ends. Just stay on the rudder until it has stopped its rollout.

#### GENERAL FLIGHT PERFORMANCE

With the Enya engine, the model flies nicely at about 1/2 throttle. It carries good momentum through all maneuvers and breaks nicely when you put it in a stall. The model has very nice control balance and responds instantly to all the maneuvers you ask it to perform.

#### AEROBATICS

With so much power available, I first tested the model's vertical performance. The plane can go straight up for as long as you like! The control surfaces are big, and using high rates, the model is very nimble and responds nicely to control inputs. Stall turns are effortless, and loops can be flown as large as you want; only minor control corrections are required to stay on track. Tight loops are also easy, and the model doesn't snap out of the maneuver when you use the recommended control throws. Rolls are fast and very axial on high rates. Knife-edge flight is a delight. The larger rudder provides plenty of control, and though I felt that there was a slight "tuck" toward the wheels, there's almost no roll coupling, even with most of the rudder kicked over. Knife-edge loops are again well within the capabilities of the .40-size Ultimate Biplane. Inverted flight required a bit of down-elevator to hold level flight. Snap rolls are crisp; they start instantly and stop on a dime!



The next step is to install the threaded aluminum interplane and cabane strut fittings. The holes are predrilled, and the fittings are simply screwed into the wings. The lower wing is bolted into place and all the hardware comes already installed. Once I had bolted the two wings in place, I installed the aileron interplane struts and the 2-56 interconnecting slave rods, keepers and clevises to connect the upper and lower ailerons. When the wings and all the control linkage are in place, check the wing alignment, and lock the aluminum fittings in their threaded holes using thin CA.

• **Engine installation.** For my test model, I used an Enya .50SS. Using the included engine mounts, this engine fit nicely into place without my having to cut large clearance openings in the cowl. The engine has to be canted slightly counter-clockwise to fit. I used a standard Enya muffler, but for it to clear the bottom of the firewall without my having to cut a recess in it, I installed an 1/8-inch-thick aluminum spacer between the engine and the muffler. A plastic throttle pushrod and guide tube (included in the kit) are very easy to install with the fuel-tank hatch removed. A white plastic spinner is provided,

but I used a Tru-Turn aluminum "Ultimate"-style spinner. The Tru-Turn spinner's longer profile enhances the model's scale appearance.

• **Fuel tank and hatch.** The supplied fuel tank fits nicely in place through the hatch opening below the firewall. I installed a two-line fuel system and then secured the tank with Hobby Lobby PFM adhesive. After I had installed the fuel tank, I screwed the formed-plastic tank-hatch cover into place with the supplied screws. The cover has a recess molded into it to fit a standard muffler. I finished the fuel system by installing a Du-Bro fuel fitting, which I attached to a plywood bracket that I glued to the firewall. The bracket holds the fitting so it lines up with an opening that I had cut in the cowl. This allows me to remove the cowl without having to remove the fuel lines.

I really enjoyed assembling the Ultimate 40. Its quality is topnotch, and the instructions are excellent. The model is a miniature clone of its popular 1.20-size brother, and it retains all its fine aerobatic performance. This one is a keeper for anyone who wants big fun in a smaller package! ✚

**Left (top to bottom):** the cabane struts come installed. It takes only a few moments to install and remove the top wing. • The aileron servos are installed in front of the control surfaces in each lower wing panel. This formed-plastic hatch cover acts as the servo mount. • Note the indentation molded into the plastic fuel-tank access hatch. It provides clearance so a standard muffler can be used. • Just like its bigger brother, the Ultimate 40 has pull/pull cables for both rudder and elevator control. All the hardware is included.

*APC Props; distributed by Landing Products (530) 661-0399; apcprops.com.*

*Dave Patrick Models (815) 457-3128; davepatrickmodels.com.*

*Du-Bro Inc. (800) 848-9411; dubro.com.*

*Enya; distributed by MRC/Altech (732) 225-2100; modelrectifier.com.*

*Hobby Lobby (615) 373-1444; hobby-lobby.com.*

*JR; distributed by Horizon Hobby (217) 352-1913; horizonhobby.com.*

*Tru-Turn; distributed by Romco Mfg. Inc. (281) 479-9600; tru-turn.com.*

*Wildcat Fuel (888) 815-7575; wildcatfuel.com.*




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*by John Reid*



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**F**utaba has always been on the cutting edge of the development of proportional RC radio systems; in fact, it offers some of the most sophisticated systems. Now Futaba brings that level of sophistication into the new T6EXA—a sport system that any novice pilot will be able to program. The T6EXA brings competition mixing controls to sport fliers at a great price.

## What you get

When you buy the T6EXA system, you get the programmable T6EXA 6-model memory transmitter, the R127DF 7-channel receiver, a 4-cell 600mAh battery, four S3002 servos and mounting hardware, a SWH-13 switch harness, a flap-control lever, an AC battery charger, a frequency clip, a neck strap and a 20-page instruction manual that contains everything you need to know about programming and using the transmitter. There is even a chapter on how to install all of the airborne radio components and mount the receiver antenna.

## Programming controls

When the transmitter is initially turned on, the selected model (1 to 6) is displayed with the current transmitter voltage. The T6EXA can hold 6 model configurations. Each specific model memory stores the settings for a particular plane and can recall it at any time. The data stored for each model are: the control throws, trims, dual rates and endpoint adjustments (EPA)—along with any mixing elements.

# T6EXA



## SPECIFICATIONS

**PRODUCT:** Futaba T6EXA

**TYPE:** 6-channel computer radio w/6-model memory

**DISTRIBUTOR:** Great Planes

**TRANSMITTER:** 6-channel, dual stick (Mode II)

**RECEIVER:** R127DF narrowband, 7-channel; dimensions: 1.39x2.52x0.82 in.; weight: 1.5 oz.

**SERVOs:** 4; 1.3-oz. (weight); \$3004 ball-bearing; 44.4 oz.-in. torque

**ACCESSORIES:** SWH-13 switch harness; 4-cell, 600mAh; dual-output receiver battery charger; 9-in. aileron extension cord; servo mounting hardware and extra output arms; flap-control lever; frequency clip; neck strap; instruction manual.

**PRICE:** \$199.99

**FEATURES:** 6-channel control; 6-model memory; programmable mixer; 4 wing preprogrammed mixers

**COMMENTS:** even with all of its advanced programming features, this radio is easy to program.

### HITS

- 6-model memory.
- Thorough, easy-to-read instruction manual.
- Digital trim tabs
- Price is right.

### MISSES

- Values can be set at 0, thus inadvertently making a channel unresponsive.

enter by simultaneously holding the mode and select keys down for one second, you can access the mode key to scroll through each of the seven functions.

• **Model select.** Here, you assign a number to your plane (1 through 6) and enter all the pertinent data for that model. Everything you enter, even the trim-tab settings, will be stored. A data-reset function allows you to clear the memory and return to factory defaults if you no longer need the settings (I'll assume that's because you sold the plane!).



The main screen; it displays the model number and transmitter-battery voltage.

• **Servo-reversing.** This is extremely easy with the 6EXA. All 6 channels can easily be reversed, and you will never again have to worry about where you install your servos. Select a channel by pressing the select key (1 to 6), and then push the data-input button up for normal throw and down for reversing throw.

• **Dual rates and exponential.** These functions are controlled by using the dual-rate function screen. Only elevator and ailerons have the dual-rate function, and when you flip the switch, they are activated simultaneously. You can toggle between high rates and low rates. When you initially set the model up, be sure to set the endpoint adjustment (EPA) first because this will affect the throw distances. You could inadvertently set either or both of the dual-rate values at 0, in which case, that channel would not respond. Avoid dropping below 20 percent on any dual-rate value.



Top: the dual-rate switch can have high rates when it is up or down—you decide. The flaps knob allows variable flap control. Bottom: the dual rate and exponential window.

The exponential is in the same function window as the dual-rate settings; again, this works only on the elevator and ailerons. Negative exponential (-) decreases initial servo movement while positive exponential (+) increases initial servo movement. You can set the exponential curve at anywhere between -100 percent and +100 percent. This is one function you will really want to try. It will smooth your plane's control response by preventing your jittery thumbs near center stick from inadvertently affecting its flight path.

• **Endpoint adjustment (EPA).** This is used to fine-tune servo throw in cases where adjusting the control linkage can't do it. A perfect example of this is the throttle hookup. EPA of 0 to 120 percent is available on all 6 channels. The optimum control throw is at or near 100 percent. If you need to input a setting of below 70 or above 120 percent to achieve the correct throw, consider changing the pushrod connection or the length of the servo arm to bring your values closer to 100 percent.

• **Trim settings.** Trim is generally set using the four trim levers on the front of the transmitter. These trim levers are set in increments of 5, but you can select a finer adjustment by using the



trim-function menu. The servo-trim values can then be adjusted in increments of 1. The only drawback is that you have to land the plane, adjust the trim values and then take off again to test your trim adjustments.

- **Mixing.** There are four wing-mixing functions in this menu, and pushing the data-input button will cycle through the choices. The channels that will be mixed are all set and cannot be changed. The elevon mixing is intended for tailless flying wings such as delta wings. It mixes the aileron channel with the elevator channel; this allows the elevons to operate in unison as



One of four wing-mixer screens.

elevators and in opposition as ailerons. The flaperon mixing function will allow the ailerons to work both as ailerons and as flaps. The V-tail mixing (used on aircraft such as Beechcraft Bonanzas) allows the ruddervators to work both as rudder and elevator.

- **Programmable mixer.** This is a great function for an entry-level computer radio. It allows you to mix any two channels—one as the master and the other as the slave. You not only get to pick out which channels you want to mix, but you also choose the percentage of movement you want the slave to move in proportion to the master. By mixing rudder and elevator, you can prevent your plane from falling out of a knife-edge. It works like this: the rudder (master) is the control you use to keep the plane in a knife-edge. For every rudder input, there will be a similar percentage change in elevator (slave) movement. Now, when you perform that dazzling knife-edge 4 feet above the ground, the only control you'll have to worry about is the rudder.

## OTHER GREAT FEATURES

The computer functions alone might be enough to sell you on this system, but the 6EXA also has other features that are worth looking at: the trainer switch is easy to reach and just as easy to hold for long periods; the trainer cord for the 6EXA is compatible with all Futaba radios; the same switch as you use for training is also the throttle-cut function (press and release it twice in quick succession). This throttle-cut function is on a separate switch, so it allows you to set a reliable idle on the throttle stick and trim without risking an inadvertent engine shutdown because you've set the throttle stick too low. The optional flap-control lever (supplied) can be used to set maximum flap deflection by mechanically limiting the flap-control dial. And because everyone's hand size varies widely, the length of both control sticks may be adjusted to make the transmitter easy for each user to hold and operate.

## SUMMARY

I'm impressed by the features Futaba includes in this "entry-level" computer radio. You'll find many of its features in higher-end

radios costing much more. When you consider all the Futaba 6EXA's features and its price of less than \$200, there's no excuse not to leap into using a computer-radio system. ✚



The trainer/throttle cut switch (upper left) and the retract switch.

## RADIO PROGRAMMING LANGUAGE

**DUAL RATES (DR):** a dual-rate switch allows you to change between two control throws—low and high rates. Your choice of control throws will be determined by the type of flying you do. If your model is flying at high speed, its control surfaces will be more sensitive; low rate will give finer control. If, however, you do aggressive aerobatics or you fly or land at low speed, the control surfaces will be less sensitive, in which case high rates will give you better control.

**ENDPOINT ADJUSTMENT (EPA):** this function sets the maximum distance the servo can rotate in either direction. No matter where the dual rates are set, the servo will never travel beyond the limits set by the endpoint-adjustment control.

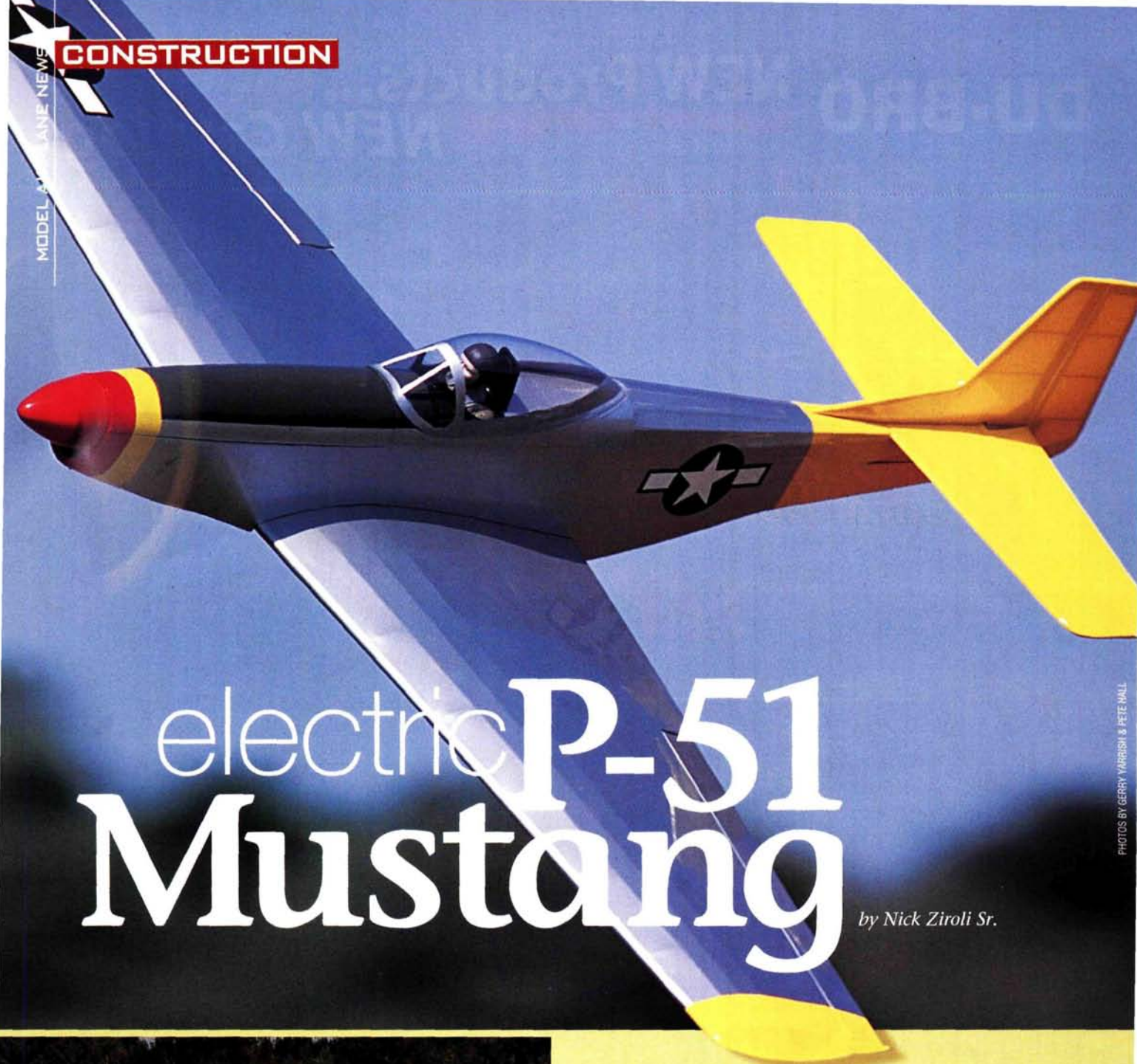
**EXPONENTIAL:** servos usually respond proportionally to control-stick input; if you move the stick halfway, the servo will travel halfway through its available range of motion. Using the exponential function, the servo can be made to move more or less than the control-stick movement (less servo movement is a more usual choice). With this setting, your control-stick inputs will result in smaller servo movements and a smoother flight. Just remember that the dual rates adjust servo travel; exponentials determine where most of the servo travel will occur.

**MIXING:** two servos can be made to operate together either mechanically, by using a Y-harness or electronically, by joining them through transmitter programming functions. When servos are joined electronically, they are said to be "mixed." Unlike mechanically mixed servos, electronically mixed servos can be made to move in opposite directions, and their endpoints can be independently set.

**SERVO-REVERSING:** this function will allow you to determine each servo's direction of movement. If, after you've hooked up the servos, a control on the model responds in the wrong direction, you can change its direction with a simple flip of a transmitter switch.

Futaba Corp. of America; distributed by Great Planes Model Distributors Co. (800) 637-7660; futaba-rc.com.



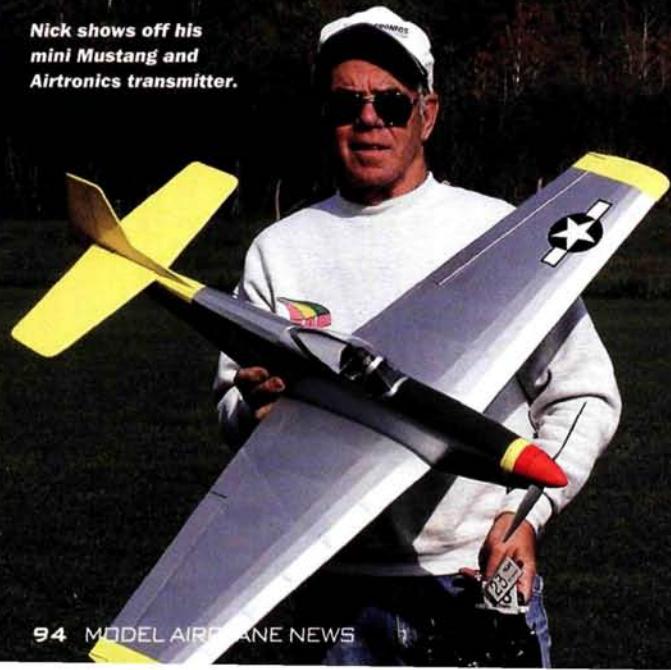


PHOTOS BY GERRY VARRISH &amp; PETE WALL

# electric P-51 Mustang

by Nick Zirolì Sr.

Nick shows off his mini Mustang and Airtronics transmitter.



## Easy-to-build backyard fighter

**Y**ou may look at this model and think, "Oh, no, not another P-51!" Well, it is difficult to find fault with its beautiful lines; the North American P-51 Mustang is without a doubt the most popular WW II fighter ever built. Flying models of the Mustang are available in every size from small rubber-powered versions to giant  $\frac{1}{4}$ -scale gas burners, warbirds, Reno racers and civilian-owned P-51s, and you can choose from many great color schemes, too. And most important, P-51s translate well aerodynamically into flying models. The few changes I made to this model improve its flight performance but are not so drastic as to change the unmistakable Mustang lines. This P-51 is intended for electric power, but a .15- to .25-size engine would also give it good performance, if you prefer glow power. Some reinforcing of the nose would be required for glow engines.

Several electric motors can be used to power this model, from a geared Speed 480 on up to a direct-drive Mega ACM16/15/7 brushless motor. I have powered it with the Astro 801G geared 010 and Astro 803G geared 020 brushless motors using 10, 800mAh Ni-Cd cells. These motors are interchangeable, but the 010 gives very mild performance; the 020 motor turning a 9x6 or 10x5 APC E prop provides the performance one would desire from a P-51.



## CONSTRUCTION

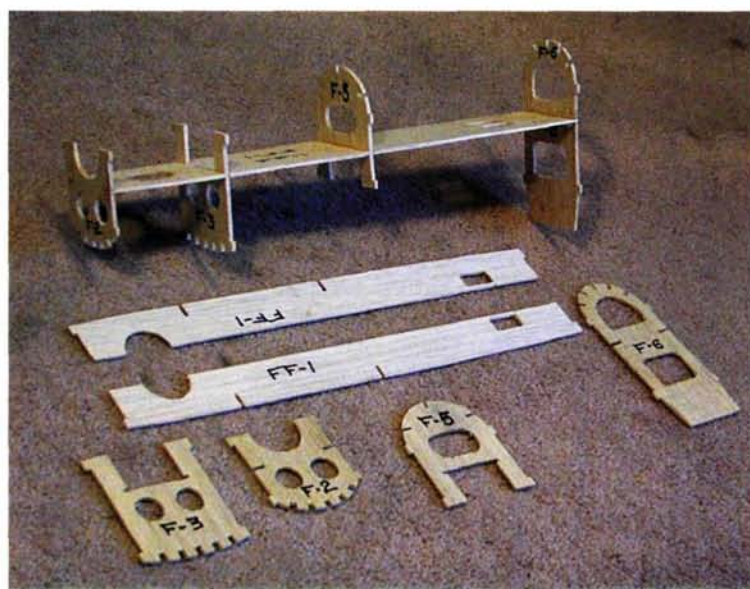
• **Fuselage.** Cut out all fuselage pieces, then glue the two FF-1 pieces together to form the fuselage floor. Assemble formers F-2, 3, 5 and 7, making sure that they are square to the floor. Glue the fuselage sides to the formers and floor assembly, then add formers F-4, F-6 and the cockpit floor CF-1. Pull the tail ends together, and add the remaining rear formers and the top  $\frac{1}{8} \times \frac{1}{4}$ -inch stringers. Check that the fuselage is straight, then pull the front ends together, and glue formers F-1 and MM-1 in place. If you plan to use a rail-mounted motor, omit former MM-1 and install the MM-2 supports and MM-3 rails. Trim the top of the MM-2 supports so that the rails position the motor in such a way that the 2-inch Du-Bro spinner lines up properly with the front of former F-1. Add the bottom nose stringers, and for additional strength, if desired, fill in the space between the nose stringers with  $\frac{3}{16}$ -inch balsa and sand to shape. Cover the cockpit side areas with  $\frac{1}{16}$ -inch CS-1 pieces. Dampen the outside surfaces to aid in bending.

Set the servos in place, and install the small plastic pushrod guides; these can be the inner tube of a plastic pushrod set. Use the  $\frac{1}{32}$ -inch pushrod wires to ensure that the guide tubes line up with the servo-output arms. I used Airtronics 94091Z Super MicroLite servos on all control surfaces. The output-arm pushrod holes on most servos are  $\frac{1}{16}$ -inch diameter and must be "bushed" to fit the  $\frac{1}{32}$ -inch wire. Insert a short length of  $\frac{1}{16}$ -inch o.d. aluminum tube in the servo-arm hole, and flare the ends to hold it in place. Small  $\frac{1}{16}$ -inch-o.d. eyelets also work well.

Install the bottom cross-brace FB-1. This prevents the sides from collapsing when hand-launching. Add the FS-1 radiator sides, then cover the fuselage bottom with  $\frac{1}{16}$ -

inch balsa lengthwise at the rear and cross-grain on the curved radiator. Round the bottom corners. Glue the WS-1 and WS-2 wing-saddle doublers to the inside of the wing opening. Glue the wing mount plate pieces WM-1 and WM-2 together, install the 6-32 blind nut, then glue the assembly securely into place.

Very lightly tack-glue the hatch-edge pieces FH-1 to the top of the fuselage formers so they are even with the inside edges of the sides. Add the hatch formers and the top stringer FH-2. Place a thin cardboard spacer and a piece of plastic wrap between FH-5 and F-4, so you don't glue them together. Plank the hatch partially with  $\frac{1}{16} \times \frac{1}{4}$ -inch balsa strips. So the hatch isn't glued to the edges of the fuselage, start to plank  $\frac{1}{4}$  inch up from the fuselage sides. The hatch is held in place with two dowels that slide into holes drilled into the lower portion of former F-1. The top of F-1 forms the front former of the hatch after it is cut away from the bottom part of the former. Once the planking glue has dried, remove the hatch by finishing the partial cuts through F-1 (see plan), add the remaining planks and sand them smooth with a hard sanding block. Glue two  $\frac{1}{4}$ -inch lengths of  $\frac{1}{8}$ -inch-diameter dowel into the holes in the U-shape hatch-mount former FH-6. Tack-glue FH-6 to the top rear part of former F-1



Start fuselage construction by assembling the formers and fuselage floor pieces, and make sure that the formers are square to the floor pieces.

with a dab of thick Zap CA, then install the hatch so the dowels fit into the holes in F-1. After the glue has dried, remove the hatch and finish gluing FH-6 to the top of F-1 with thin Zap. The aft part of the hatch is held in place with a latch made from a small plastic tube and a bent piece of wire. It's detailed on the plan.

Build the tail surfaces from  $\frac{3}{16}$ -inch-thick balsa strips over the plan. The trailing edges are  $\frac{1}{8} \times \frac{1}{4}$  inch and must be blocked up  $\frac{1}{32}$  inch to center them properly on the ribs. Block-sand the ribs to blend into the trailing edges. If desired, you can cut the tail surfaces out of light  $\frac{3}{16}$ -inch sheet balsa with lightening holes cut as indicated on the plan. If you plan to use landing gear, bend the tailwheel strut to shape and attach it to the rudder.



A P-51 Mustang, even a sport-scale model like this one, is a pretty sight in the sky. It took only a few seconds after its first hand-launch to realize that it would be a good flying model. Speed with the AstroFlight Brushless 020 is fast enough to perform long steep climbs and big loops.

Slow-flight performance is very good. Its light wing loading (11.5 oz./sq. ft.) allows it to fly very slow landing approaches—very desirable for belly landings on grass. The ESC's motor brake allows the prop to stop with its blades horizontal to prevent breakage on landing.

High-speed flight can only be described as groovy! Aerobatics can be as mild or as wild as you desire; it depends on how much control throw you set. Those called out on the plan are moderate and should be used as a starting point. Inside and outside loops, rolls, Immelmann turns, etc., can all

be done smoothly. Inverted flight takes a touch of down-elevator for straight and level flight. Want more action? Crank up the throws! You won't get hyper 3D performance, but you will get good, honest aerobatics.

Flight duration with the 10-cell, 800mAh Ni-Cd pack is a good 6 minutes. I have also used a 10-cell, 1300mAh Ni-Cd battery pack. It adds an unnoticeable 2 ounces to the P-51 and gives 8- to 10-minute flight times. Most of my flying has been done with an APC 9x6 E prop.





## CONSTRUCTION: ELECTRIC P-51 MUSTANG

• **Wing construction.** Begin by pinning the  $\frac{3}{16} \times \frac{1}{4}$ -inch bottom wing spars, the  $\frac{1}{16} \times \frac{1}{2}$ -inch hard-balsa strip and the  $\frac{1}{16} \times \frac{1}{2}$ -inch trailing edge to the plan. Do not glue the wide trailing-edge sheet to the  $\frac{1}{2}$ -inch-wide sheet at the aileron cutout area (they will be separated later). Add the  $\frac{1}{16}$ -inch sheet balsa from the spar to the trailing edge between W-1 and W-3, then glue the ribs into place. Install the WD-1 rib-angle braces, the top spar, the  $\frac{1}{4}$ -inch-square leading edge and the top trailing-edge sheeting. Remove the wing assembly from the plan, and glue the  $\frac{1}{16}$ -inch plywood W-3A and W-4A landing-gear supports to the ribs. (Leave these parts off if you don't plan to install landing gear.) Glue the W-1A rib doublers to the outside of the W-1 ribs.

Make sure that the  $\frac{3}{16}$ -inch dowel pocket is clear of glue for the wing-mounting dowel. Add the  $\frac{1}{8}$ -inch-square top and bottom spars, then assemble and install the landing-gear mounting blocks, if needed. Landing-gear blocks can be made from  $\frac{3}{8} \times \frac{1}{4}$ -inch hardwood with an  $\frac{1}{8}$ -inch-square groove cut into them, or you can make them from  $\frac{1}{4}$ - and  $\frac{1}{8}$ -inch plywood glued together.

Sheet the top center section with  $\frac{1}{16}$ -inch balsa. Cut and fit the pieces between the front spars. Glue in the SM-1 servo mounts flush with the outside of the wing surface. Cut the ailerons away from the wing panels, then sand the back of the wing flat and cap it with  $\frac{3}{32}$ -inch balsa. Add the aileron end ribs and the  $\frac{1}{16}$ -inch plywood AH-1 control

Drill a hole at that spot, and secure the wing in place with a 6-32 $\times\frac{3}{4}$ -inch-long screw. Check the wing alignment, and if it's good, install the plywood WM-3 wing-hold-down screw plate.

### COVERING AND FINISH

Sand all the parts smooth, and cover the model with your favorite iron-on material. I used Ultracote from Horizon Hobby. Cut away the covering on the wing's bottom where the radiator is. It's easier to build the radiator in place after the wing has been covered. Attach the wing to the fuselage, so FS-4 can be located properly against F-7. Add the second FS-4 and the FS-2 sides. Pull the fronts together, and glue FS-3 between the sides. Sand the bottom edges flat, and



**Left:** the engine-cowl chin is formed by these curved stringers. The assembly is light and strong. **Right:** the main hatch is built in place on top of the fuselage structure. Note the plastic sheet used to prevent the rear former from being glued to the fuselage.

## SPECIFICATIONS

**MODEL:** P-51 Mustang

**TYPE:** electric sport scale

**WINGSPAN:** 46 in.

**WING AREA:** 390 sq. in.

**WEIGHT:** 31 oz. with 10-cell, 800mAh battery

**WING LOADING:** 11.5 oz./sq. ft.

**LENGTH:** 35.75 in.

**MOTOR USED:** AstroFlight 803G geared 020 brushless

**RADIO REQ'D:** 4 channels (rudder, elevator, aileron, throttle)

**RADIO USED:** Airtronics RD6000 TX with 92515Z Micro RX and 4 94091Z Super MicroLite servos

**COMMENTS:** designed by Nick Zirolli Sr., this electric Mustang can also be powered by a .15 to .25 glow engine. You can build it with or without landing gear, and the canopy and decals are available from House of Balsa. The model has traditional balsa-and-plywood construction and can be built with built-up or solid-sheet tail surfaces. The portion of the fuselage between the spinner and the front of the canopy forms the main hatch for easy replacement of the power battery pack!

horns. Sand the fronts of the ailerons enough so they will fit into place with a  $\frac{3}{32}$ -inch leading-edge face cap. Glue the face cap into place, and sand it flush with the aileron's top and bottom surfaces. Cut the hinge slots, and temporarily attach the ailerons to the wing. Add the tips and trailing-edge filler pieces, and sand them to match the ailerons. Sand the root ends of the wing panels so they're a good match, then dry-fit the panels together with the  $\frac{3}{16} \times 2$ -inch-long wing-mounting dowel in place. If the assembly fits well, epoxy the panels together with the dowel in place. Use two short pieces of  $\frac{1}{8}$ -inch dowel to align the wing panels. The dihedral should be about  $1\frac{1}{2}$  inches under each tip.

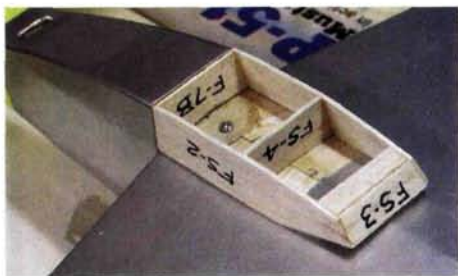
Fit the wing to the fuselage, and file the front dowel hole in F-3 as required to fit. When you're satisfied, glue F-3A into place using the wing to position it. Thread a 6-32 screw into the wing-mounting plate, and let it protrude just enough so it touches the wing. Position the wing in the saddle, making sure that it's square to the fuselage, and press down on the wing so the screw head makes an indentation in the top of the wing.

cover them with  $\frac{1}{16}$ -inch balsa. Round the edges and cut a hole for access to the wing-attachment screw.

Glue the tail surfaces into place. Add the headrest, and paint the cockpit interior black. Install an  $\frac{1}{8}$ -scale pilot, and glue the canopy into place with Pacer Canopy Glue. A P-51-style canopy and self-adhesive bars-and-stars insignia are available from House of Balsa. Mount the servos, control horns, pushrods and receiver. If the receiver is thin enough, you can attach it with double-foam tape to the bottom of the fuselage floor in front of the servos. Set up control throws as shown on the plan.

To eliminate the long antenna wire hanging out of the tail, I used a short, base-loaded antenna from Hayes Products. It has worked very well for me, giving range far in excess of what is required for this size of model. Operate the motor during a range check to ensure that electrical noise or the speed control aren't causing any range-robbing interference. Install the motor, prop and spinner, and then position the battery pack to obtain the balance point shown. To secure the battery, wrap it with a strip





The best way to ensure that the belly scoop fits properly is to build it in place after the fuselage and wing have been covered.

of 1-inch-wide double-sided hook-and-loop fastener material called "One Wrap" (available from Vel-Tye LLC). Then glue this material securely to the fuselage floor with thick Zap. I also placed a piece of 1/8-inch foam wing-saddle tape under each end of the battery to help prevent it from shifting around.

The location of the battery ramp BR-1 depends on the battery position. Its purpose is to deflect the battery up and over the motor and speed control in case of a mishap, sudden stop, or crash. Brushless motors and any speed controls are expensive, and battery packs are heavy. I think you get the picture. The BR-1 should fit from the front of the battery to the top of F-2.

I think you will like the way this P-51 flies. Since I did not use the landing gear, I can't describe ground handling, but I can't imagine that it would be a problem. If you build your own Mustang, remember that the editors of *Model Airplane News* always appreciate receiving photos and comments about your construction projects.

Airtronics Inc. (714) 978-1895; [airtronics.net](http://airtronics.net).  
AstroFlight Inc. (310) 821-6242; [astroflight.com](http://astroflight.com).  
Du-Bro Products (800) 848-9411; [dubro.com](http://dubro.com).

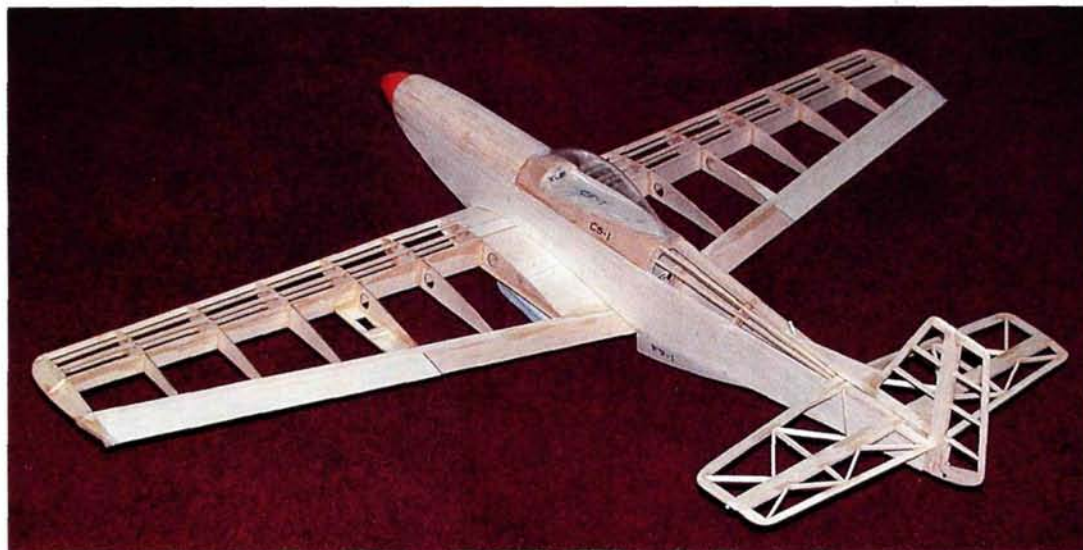
Hayes Products (714) 554-0531.  
House of Balsa (760) 246-6462; [houseofbalsa.com](http://houseofbalsa.com).  
Pacer Technology (800) 538-3091; [pacertechnology.com](http://pacertechnology.com).  
Ultracote; distributed by Horizon Hobby (800) 338-4649; [horizonhobby.com](http://horizonhobby.com).  
Vel-Tye LLC (800) 769-2842.

## ELECTRIC P-51 MUSTANG FSP0803A

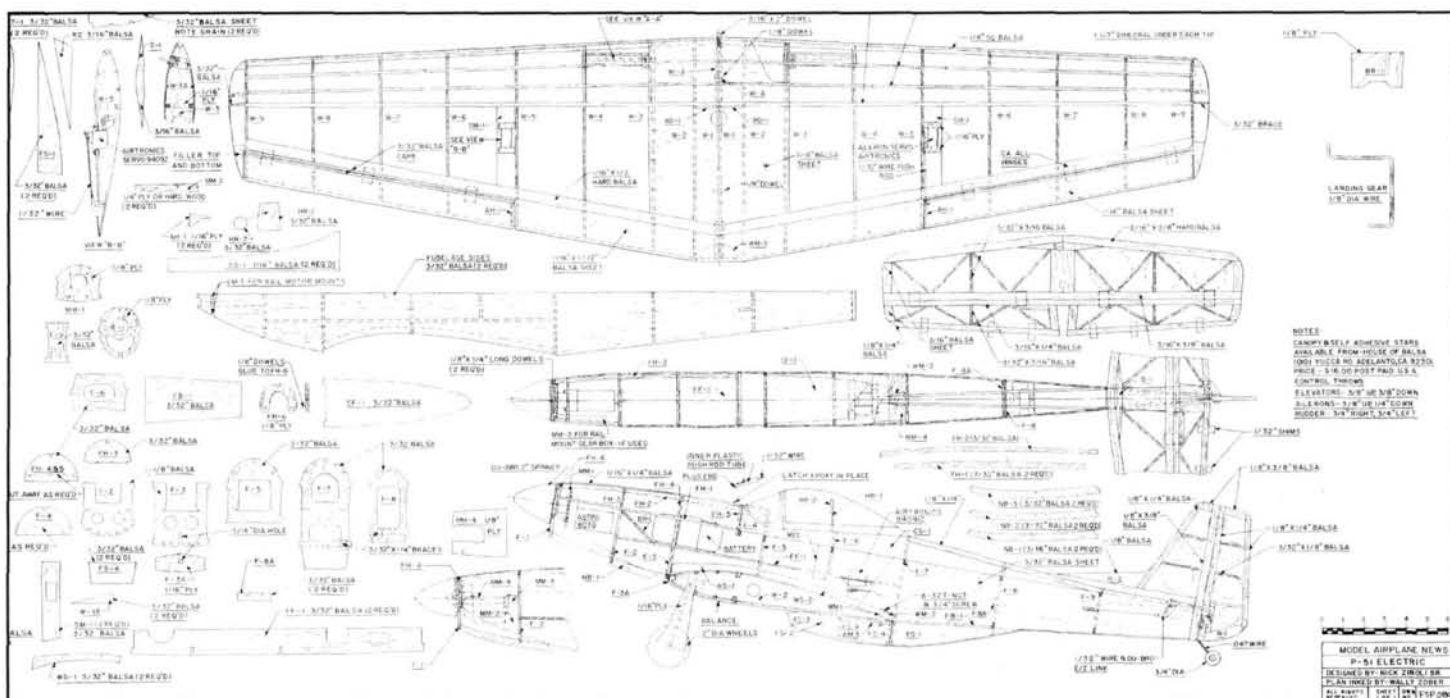
Designed by Nick Zirolli Sr., this electric Mustang can also be powered by a .15 to .25 glow engine. Build it with or without landing gear; canopy and decals are available from House of Balsa. It uses traditional balsa-and-plywood construction; build it with built-up or solid-sheet tail surfaces. The portion of the fuselage between the spinner and the front of the canopy forms the main hatch for easy replacement of the power battery pack! WS: 46 in.; L: 35.75 in.; power: geared 020 brushless; 4 channels (dual-aileron servos); 1 sheet; LD 2. \$19.95

click trip  
MODELAIRPLANENEWS.COM

SEE COMPLETE  
BUILDING  
INSTRUCTIONS



Left: the complete Mustang awaits covering. The structure is both light and adequately strong for electric power. Above: with the main hatch removed, you can see the motor and battery installation. Note the ply ramp between the motor and the battery pack.







◀ The GWS Mustang is a very popular warbird. Note the camouflage paint and the 4-blade prop—realism to the max!



▼ A Hacker-powered E-Maxx jumps over a Hacker-powered 3D airplane that's hovering vertically between the dirt stunt track's launch and landing ramps. The crowd went wild during this demo!



▲ GWS gave us a sneak peek at the prototype of its Flying Fish. Its performance made a splash!



◀ An electric-powered MS Composite Hornet hovers inverted in the flight area.



▶ This sharp-looking pattern-type model is the new GWS Formosa.

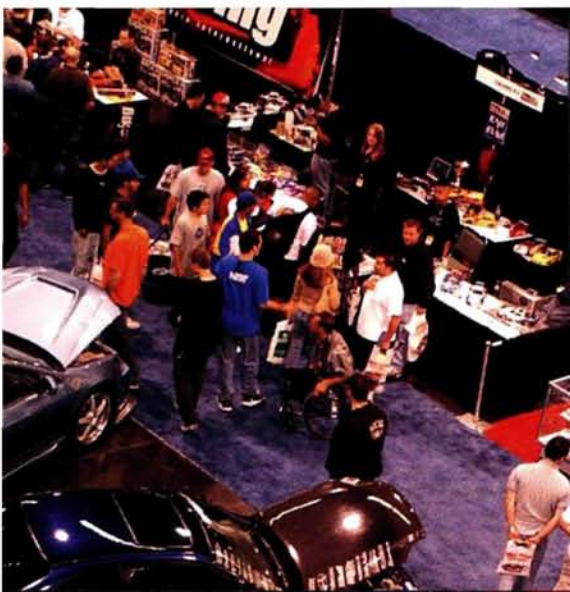


# THE GREATEST RC SHOW EVER!



◀ Marty Hansen came all the way from New Zealand to attend RCX. Is that enthusiasm, or what?



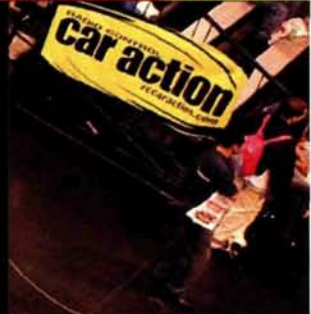


► This Hornet sports a custom canopy from JMD Models Inc. Other styles are also available.



► Tell us what you really think about the "Try-Me" track!

► Here's Horizon Hobby's new, larger version of the popular Miss Bud hydroplane. Powered by a Zenoah G-23, it will really rip up your pond or lake.



# WOW! WHAT A WEEKEND!

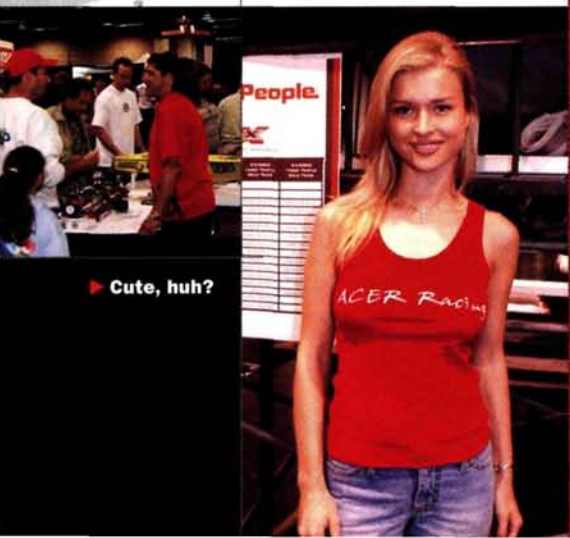
## AT THE FIRST EVER RADIO CONTROL EXPO—

also known as RCX—thousands of enthusiasts converged on the Anaheim Convention Center in sunny southern California. The show was unlike any other RC event; it covered the full range of RC, and everywhere you looked, something cool was happening: 1/8-scale cars backflipping over hovering airplanes, 200-pound battling robots slugging it out, boats churning up huge rooster-tail waves, inverted micro-3D helicopters, indoor pylon racing and aerobatic demos. RCX had something for everyone! Besides the action, major manufacturers such as Hobby People, GWS, Hobbico, Horizon, Kyosho, Tamiya, Pro-Line and Aeromodel showed thousands of spectators the hottest new products for summer fun. Many other manufacturers were also on hand to display and sell a wide variety of products to anyone who was looking for a bargain. We saw a lot of happy customers.

RCX is a collaboration of two highly successful companies—Air Age Media, the world's leading publisher of RC magazines, including *Model Airplane News*, *Backyard Flyer*, *RC Car Action* and *RC Nitro*—and Vision Entertainment, producer of some of the hottest action sports and lifestyle events, including *Hot Import Nights* and *Fresh Tracks*.

But RCX wasn't just about buying cool stuff. If you always wanted to get your hands on an RC car and try it for yourself, RCX was the place to be. The Hobby People-sponsored "Try-Me" track was always packed with eager drivers looking for action. The Fly Zone was another hot spot, with high-flying demos by GWS and Hacker. Oh, you never thought that an electric-powered plane could hover like a helicopter? Well, RCX showed that it is possible—and a whole lot more. The flying was just incredible!

If you missed the show this year, don't worry; you'll be able to check it out next spring when RCX returns to the SoCal area on April 24 and 25. To see what you missed, check out these pictures from RCX!



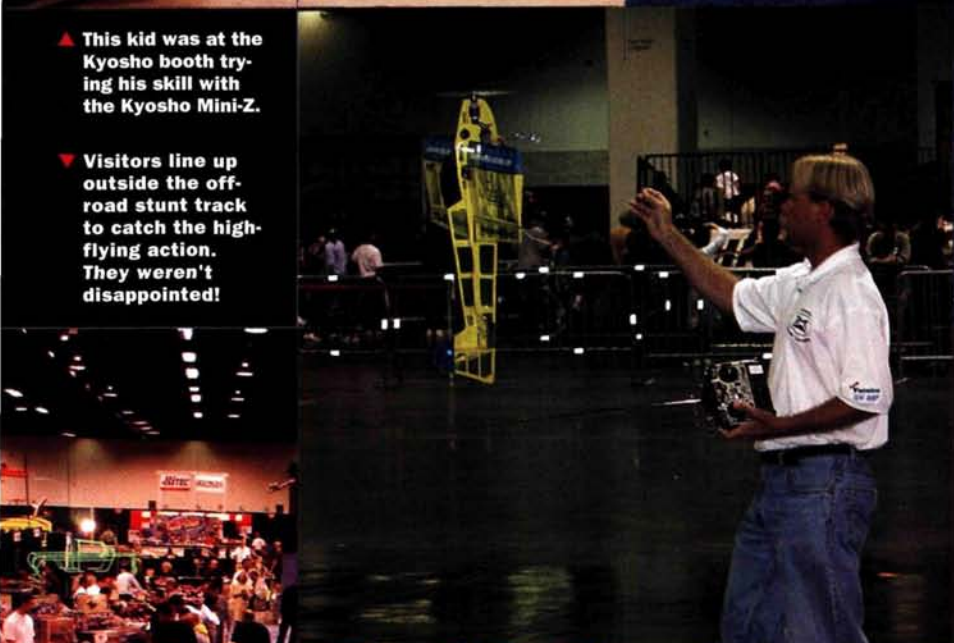
► Cute, huh?





▲ This kid was at the Kyosho booth trying his skill with the Kyosho Mini-Z.

▼ Visitors line up outside the off-road stunt track to catch the high-flying action. They weren't disappointed!



◀ Jason Shulman launches his self-designed aerobat vertically for some 3D flying in the flight zone. Who needs a runway?



◀ A Hacker-powered boat streaks around the boat pond.







▶ This sharp-looking Pitts Special is from Hobby People. Word has it that it will be released later this summer.



▶ Look out! Comin' at ya!



▶ It's a heli-jet! This baby can really move out.



▶ The full-size Miss Budweiser hydro was an awesome sight.



▶ Dave Villwock, the driver of Miss Budweiser, signs an autograph for an admiring fan.

▶ The natives are getting restless! Folks line up to be among the first to see RCX on Saturday morning.







▲ Kids test their driving skills on Kyosho's custom-made micro tracks.



▼ Aki Suzuki, president of Kyosho, is surrounded by some of the hotties in the Kyosho booth.



► President and CEO of Air Age Media, Louis V. DeFrancesco Jr., does his thing at the RCX award ceremony. Lots of trophies were handed out to the best in the biz.

▼ The Hobby People shop was jumpin' all weekend with deals on many products.



▼ This lucky winner's smile says it all! Loads of prizes were given away during the weekend.

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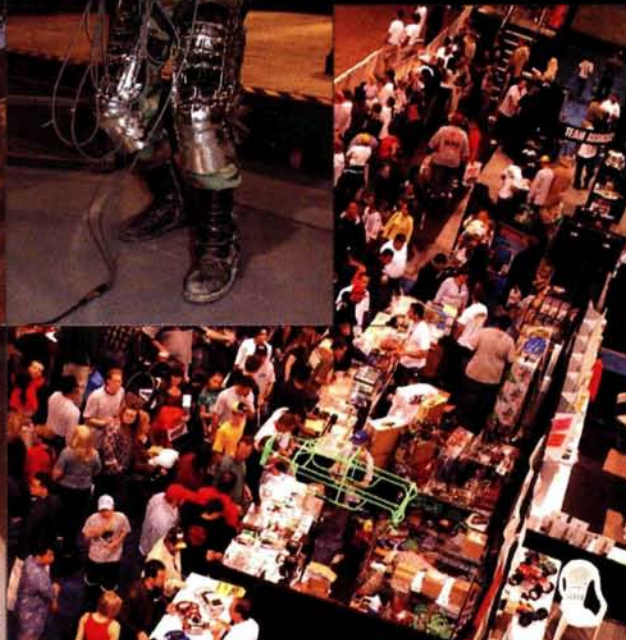
▲ Something for everyone; retailers were treated to seminars sponsored by *Model Retailer* magazine.



▲ At the RCX booth, Miss Becky handed out copies of *Model Airplane News*, *Backyard Flyer*, *Radio Control Boat Modeler*, *RC Car Action* and *RC Nitro* magazines during the show.



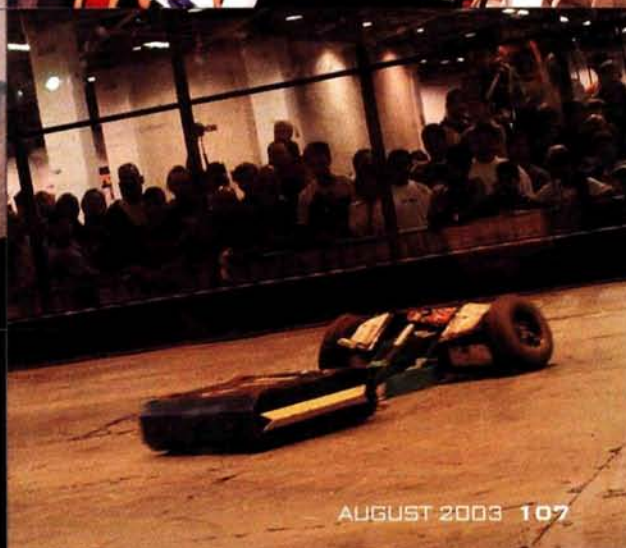
▲ Madman Roy Hellen, the master of ceremonies for Steel Conflict, provided colorful commentary of the incredible action during the brutal and exciting Battle-bot matches.



► One of the DJs mixin' tunes over at the off-road stunt track.

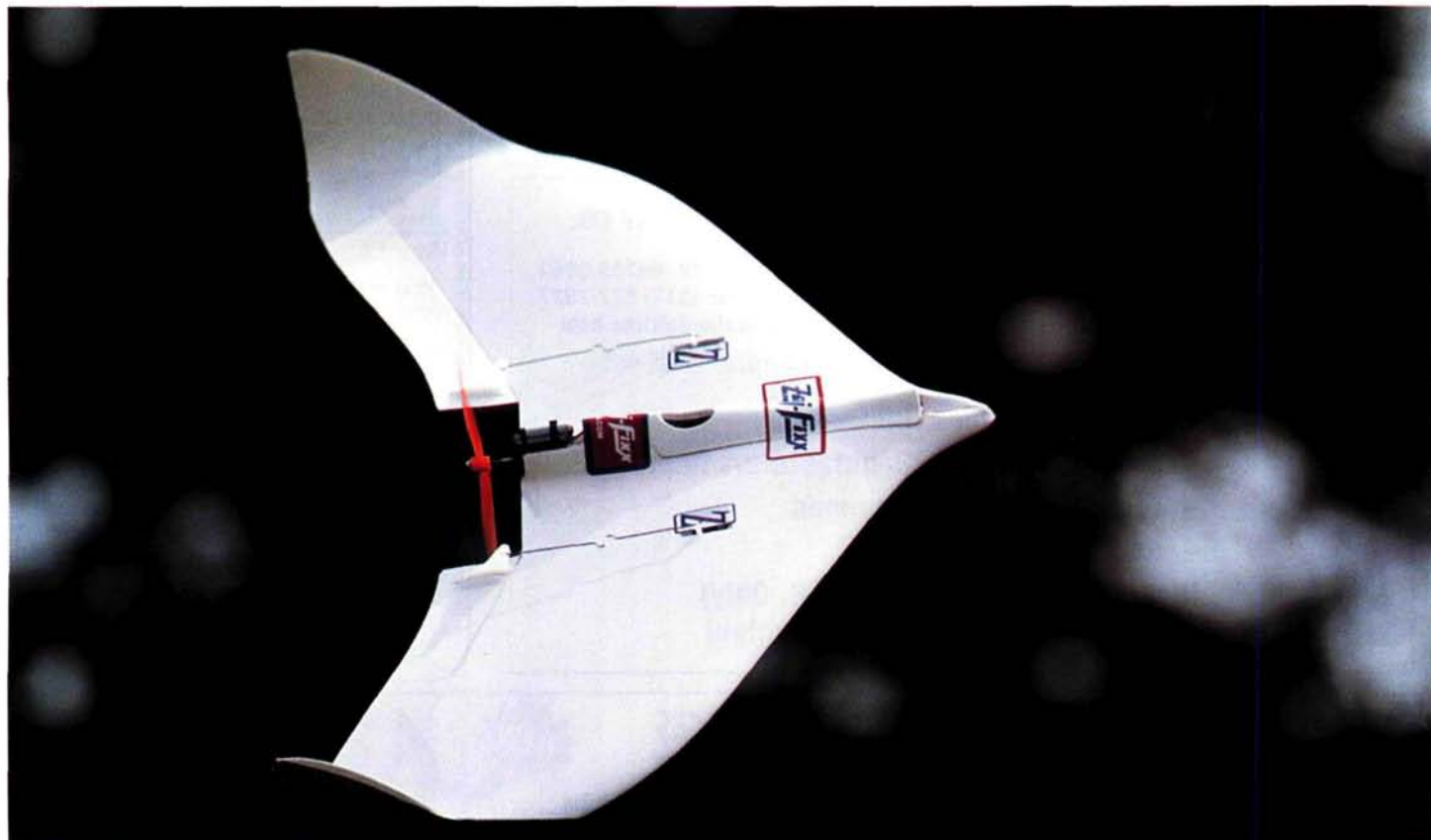


► Check out the crowd at the Steel Conflict arena during a metal-munching match. Can you say "mayhem"? ■





# *Zagi-FiXX—backyard flying wing*



**D**o you love your Zagi flying wing but wish you could fly it in a smaller field or a park? Then this news will bring a smile to your face! Trick R/C has released its new Zagi-FiXX ARF, and it is just such a plane. The new FiXX possesses all of the performance abilities you've come to expect in a Zagi wing combined with the slow speed you need to fly the plane in a small area. This new breed of Zagi is molded out of a very smooth material that Trick R/C calls "Z-Foam" (previous Zagis were made out of EPP or white foam covered with tape). Z-Foam is quite light yet durable. The FiXX arrives as molded halves; you need only install the included GWS EPU-3 motor, join the halves and add radio gear. These tasks take less time than it does to charge the included 8-cell, 370mAh NiMH battery!

## **IN THE AIR**

I've been really happy with previous Zagi wings, and I felt confident that this one would be just as easy to fly. I was right; with a little help from an experienced pilot, anyone will be able to fly the FiXX.

A nice addition to the FiXX is a molded landing skid/launching handle. One of the problems I had with other Zagis was how to hold onto the wing safely when I launched

## **SPECIFICATIONS**

**MODEL:** Zagi-FiXX

**MANUFACTURER:** Trick R/C

**TYPE:** electric flying wing ARF

**SMALLEST FLYING AREA:** baseball diamond

**BUILDING SKILL LEVEL:** basic

**FLYING SKILL LEVEL:** beginner/intermediate

**WINGSPAN:** 40 in.

**WING AREA:** 285 sq. in.

**LENGTH:** 17.5 in.

**WEIGHT:** 10.3 oz.

**WING LOADING:** 5.2 oz./sq. ft.

**NO. OF CHANNELS:** 3

**DRIVE SYSTEM:** GWS EPU-3 motor geared 3.5:1; 8x4.3 propeller

**RADIO USED:** Futaba FP-8UAP transmitter, Hitec Electron 6 micro receiver and 2 Hitec HS-55 sub-microservos

**SPEED CONTROL USED:** electronic variable with BEC (included)

**BATTERY USED:** 8-cell, 370mAh NiMH (included)

**FLIGHT DURATION:** 10 min.

**PRICE:** \$150





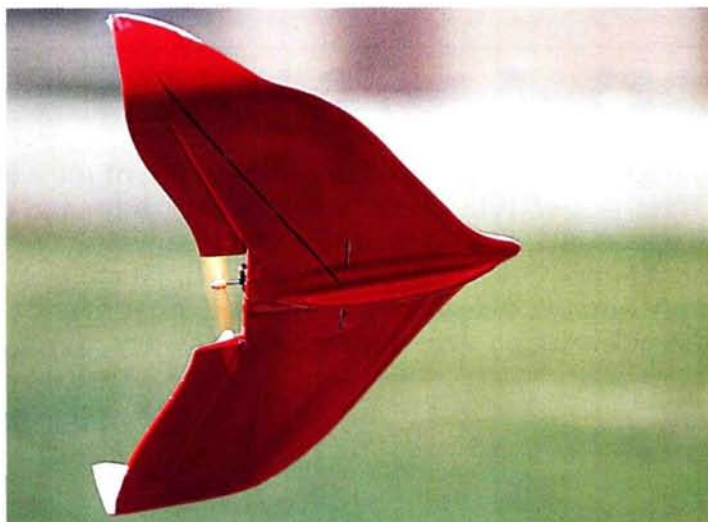
it. The landing skid eliminates this problem; it lets me get a good grip on the wing so I can hand-launch it. On the first flight, I tossed it with the motor off, and when I hit the throttle, the FiXX instantly began to gain altitude. Its sleek looks made me think it would go a million miles an hour, but I was pleasantly surprised to find that it was slow and very controllable. Its top speed is about 15mph—fast enough to penetrate light winds but slow enough to fly within a baseball diamond. The control was so good that I had no problem flying the plane right in front of me. In fact, I felt so comfortable with the FiXX that I started doing aerobatics during the first test flight!

#### AIRSPPEED

Airspeed is extremely important to any flying wing, including the FiXX. All flying wings use elevator/ailerons, also known as elevons, that act as flaps or spoilers. Too long a control input—either elevator or aileron—will cause the plane to slow down and stall. I stalled and hit the grass a couple of times (unplanned landings) because the FiXX was flying too slowly. These “landings” didn’t cause any damage, but I quickly learned to keep my airspeed up. Though the FiXX has no bad tip-stall characteristics (its stalls are straightforward), you can quickly recover just by pointing its nose downward.

#### MOTOR PERFORMANCE

The FiXX’s motor provides ample flying power but not always enough to get you out of trouble if the airspeed drops. The flight time, however, is great; I was able to stay in the air for a good 10 minutes at full throttle and experienced no



significant loss of power toward the end of the flight.

I recommend having at least a couple of spare charged batteries, so you don’t have to wait for them to charge. They are fairly inexpensive when you purchase them in multi-packs. The high-capacity NiMH batteries require 1 hour’s charge time for longest life. With just a few charged batteries, you can enjoy more time in the air instead of waiting on the ground for your battery to charge.

#### AEROBATICS

The FiXX is great for gentle, easy flying, and this is where flying wings generally excel. That isn’t to say that the FiXX won’t challenge your thumbs; although flying wings are limited to aerobatics that combine loops and rolls, I still found the FiXX exciting to fly. Loop-to-loops were easy and tight, but rolls required some elevator compensation. One maneuver I really enjoy doing is a horizontal figure-8, flying half of it inverted. To perform this maneuver, I pull a hard left turn until the FiXX completes the first circle. Then I input right aileron until the Zagi rolls over to just past inverted and apply

some down-elevator to complete the second circle. This stunt really looks great with the flying wing. I increased the control throws and found that the FiXX would perform something that resembles a snap roll when I pulled the stick to either the bottom right or left corner. What impressed me most, though, was the FiXX’s inverted flight characteristics; I needed just a little down-elevator for level flight. Flying inverted, I found that with a little dive, I was able to come out of inverted flight with a half outside loop. Now, that’s a maneuver you can’t do with every park flyer!

The FiXX is unique—not only in looks but also in functionality. Because it’s easy to fly and very aerobatic, it bridges the gap between beginner and intermediate aircraft. If you want an aerobatic plane that’s easy to fly in tight airspace yet still challenges your pilot skills, the Zagi-FiXX is an excellent choice. ✚

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**SEND YOUR ANSWER** to *Model Airplane News*,  
Name that Plane Contest (state issue in which plane appeared),  
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Can you identify this aircraft?



Congratulations to Herman Goldstein of Snyder, NY, who was among—well—many of our readers to correctly identify the June mystery plane as the Culver TDC2-1 (Navy designation) or PQ-14B (Army designation). Formed in 1939 to take over the manufacturing and sales rights of the Model G two-seat cabin monoplane from the Dart Manufacturing Corp., the Culver Aircraft Corp. set to work the following year on producing a light-cabin monoplane called the Cadet. It was marketed in two versions: the LFA with an 80hp Franklin engine and the LCA with a 75hp Continental engine. Production of the Cadets ended when the United States entered WW II, but in 1940, the U.S. Army began attempting to perfect the use of radio control for target use in training air and antiaircraft gunners. Culver was among several companies invited to submit design ideas for the project, and the resulting PQ-8 was the first radio-controlled target designed and built for the U.S. Army. Several versions followed, including the PQ-8A and PQ-14 (with corresponding TDC-1, TDC-2 and TDC2-1 designations for the Navy); all were based on the original LFA version of the Cadet. ✦



The winner will be chosen, four weeks following publication, from correct answers received (delivered by U.S. mail) and will be awarded a free, one-year subscription to *Model Airplane News*. If already a subscriber, the winner will be given a free, one-year subscription extension.



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BY JAIME STUDD

## Move over NASA ...



Above: the White Knight launch system soars high above the Mojave Desert on a recent test flight. Below: here, the SpaceShipOne is mated to the White Knight. It is intended to take off and be launched from this position. Center: the SpaceShipOne stands alone. Bottom: view from the White Knight's cockpit.

... there's a new game in town. There may soon be more than one way to get to the moon. Many a court battle has been fought to ensure that no single company enjoys a monopoly over an entire market. These days, in fact, it seems no one is immune from competition—not even NASA.

While privately manned commercial space travel may seem like the stuff of science-fiction novels and blockbuster movies, in reality, it isn't as far-fetched as one might think. Aircraft designer Burt Rutan of Scaled Composites in Mojave, CA, recently unveiled a fully built launch system and spacecraft called the White Knight and SpaceShipOne, respectively.

The system is designed to work in a manner similar to the launch process used by NASA and Air Force test vehicles in the 1940s and '50s: the White Knight would carry SpaceShipOne up to an altitude of 50,000 feet and then launch it into a steep climb. The spacecraft itself has manual stick-and-rudder controls for subsonic flight as well as electric controls for supersonic flight and cold-gas thrusters for space travel. On reentry, the rear portion of SpaceShipOne, including its twin tails and oversize flaps on the wing's trailing edge, are intended to create incredible drag, slowing the vehicle down to the point at which it can easily glide back to Earth.

Though SpaceShipOne has yet to be flight-tested, the White Knight launch system was recently successfully flown at an altitude of 9,000 feet, and the release mechanism that will effectively launch the spacecraft from it has proven effective in several ground tests.

There are no immediate plans for passenger travel or even for government certification. Instead, Rutan focuses his efforts on simply proving that his privately designed, built and funded spaceship and launch system are capable of sending people into space. His team of four test pilots cross-trains on both the White Knight and SpaceShipOne, which share similar aerodynamic features and electronics.

The first SpaceShipOne flight tests are scheduled to take place soon, and if flights outside the earth's atmosphere eventually prove successful, Rutan and his team will not only be one significant step closer to proving that privately manned space travel is possible, but they'll also be one step closer to eligibility for the coveted X Prize. First offered nearly a decade ago by Dr. Peter Diamandis, the X Prize is a \$10 million reward that will go to the first private firm that can build a reusable manned-space vehicle, fly it to the suborbital altitude of 62 miles and then repeat the mission. It's considered a key litmus test for the viability of manned commercial space flight, and it remains as yet unclaimed. The question is: for how long? ✚

